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A QUANTITATIVE STUDY OF THE RESULTS OF GROUPING FIRST-GRADE CLASSES ACCORDING TO MENTAL AGE

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In a study of the results of sorting pupils into classes upon the basis of intelligence as denoted by mental age, it is essential to obtain data unaffected by instruction received prior to the beginning of the investigation. For this purpose it is necessary to choose a beginning subject, and the earlier in the school career this subject occurs, the freer will be the results from effects of previous school experiences, such as habitual attitudes, prejudices, and other acquired forms of reaction. In such a study, therefore, all data obtained from repeaters must be either excluded or treated separately. It is also necessary to decide what the criterion of results shall be. If the criterion selected correlates positively and in a high degree with general intelligence then, and then only, are we entitled to expect desirable results from grouping on a mental-age basis.

For the present investigation seven first-grade classes of the public schools of Chisholm, Minnesota, were selected. In six of these classes were grouped the pupils who had been promoted from the two kindergartens the previous June. The seventh class was a small unsorted group in an outlying district. It was included because of the smallness of the group, the wide range of ability among its members, and the excellence of the instruction given.

Prior to the June promotions, the pupils of the two kindergartens had been given an individual mental examination, using the Kuhlmann Revision of the Binet-Simon Scale.

Since from previous experience there was reason to believe that the mental age even more than the intelligence quotient conditions success in elementary-school work, the mental ages were calculated to September first, the approximate date of entering the first grade. Recommendations for grouping were made upon the basis of these mental ages.[1] There was an effort, however, to limit the strongest group to children with an intelligence quotient of not less than 100, and to reserve the weakest group for children with an intelligence quotient below 95. The division of kindergarten groups into first-grade classes in previous years had been made wholly upon the estimates of the kindergarten teachers; and so the use of test results for this purpose was, very properly, regarded by the administration as an experiment to be tried out with some degree of caution. The final grouping effected upon the dual basis of teachers' estimates and test ratings, though far from ideal for teaching purposes, serves the purpose of the present study better than more uniform grouping would have done, for it permits a comparison of the relative efficiency of groups of greater and less degrees of homogeneity in regard to mental age.

The results of the examination of the small unsorted group were not to be used as a basis of promotion from kindergarten. The pupils of this group were, therefore, not tested until the fall, when each of them was examined by means of the Kuhlmann Revision.

Near the end of the school year the problem of measuring the results of the year's work had to be met. Since the lion's share of time in the first grade is allotted to reading, it was assumed that the degree of success of a given pupil in first-grade work could best be measured by his reading ability. This abil-

[1] The superintendent, Mr. J. P. Vaughan, who has kindly permitted the use of the present data obtained during my work as school psychologist in Chisholm, and the primary supervisor, Miss Agnes Hatch, who offered most efficient help in the giving of the educational tests, were made acquainted with the results of the intelligence testing. These results were not submitted to the teachers, however, and in no case was a teacher acquainted with the mental age or intelligence quotient of any pupil. This precaution was necessary if the results of the investigation were to be free from the effects of suggestion upon the teacher as to the ability or disability of any given pupil.

ity, however, can be measured from three different angles with quite different results: (1) We can test the ability of the child to name words. (2) We can measure his ability to recognize sound elements in printed word forms and to combine them into spoken word forms. (3) We can determine the ability of the child to get ideas from printed word forms and combinations of such forms.

The reading ability of our seven groups was measured from each of these three points of view. For measuring the first two phases of the reading process the Haggerty Visual Vocabulary Scale was used, while for testing ability in reading comprehension, the Haggerty Reading Examination, Sigma I, was given with the help of Miss Hatch, the primary supervisor.

For each of the 171 cases included in this study the following data were thus available: chronological age and mental age at the beginning of the school year, sight-reading score, phonetic-reading score, and comprehension score. These data afford the basis for tentative conclusions as to (1) the efficiency of the Chisholm school system in first-grade reading; (2) the relative efficiency of the teaching in the seven groups included in the investigation; (3) the optimum mental age for beginning instruction in reading with the method used for the groups under investigation; (4) the relation of intelligence, expressed in terms of mental age, to success in each of the three phases of reading tested; and (5) finally and chiefly, the results of grouping first-grade classes according to mental age.

Regarding the 171 pupils as a single group let us consider the efficiency of reading in grade 1. The mental age of the average first-grade entrant is, theoretically, six years. The tentative standards for the phonetic and sight tests of the Vocabulary Scale are each approximately 50, while the standard score in reading comprehension at the end of the first year is 4.

The average mental age for the 171 cases was 6.07 (S. D., 0.55), or one percent above the theoretical mental age at date of school entrance. The average score in the phonetic test was 62.6 (S. D., 38.7), about 24 percent above standard; and the

average score in the sight test was 100.2 (S. D., 25.0), which was approximately double the standard first-grade score. The average score in reading comprehension was 4.88 (S. D., 3.8), or 22 percent above the norm for grade 1. These comparisons are made in terms of crude score units and without regard to the position of absolute zero points. They are, therefore, to be regarded as suggestive, rather than as quantitatively accurate, statements of the degree of superiority over the standard achievement for the grade. It is evident, however, that the 171 pupils

TABLE I. THE AVERAGE SCORE OF EACH CLASS IN EACH OF THE THREE TESTS

Class	Haggerty Reading Comprehension	Vocabulary Test	
		Phonetic	Sight
I	10	100	120
II	4	50	100
III	4	80	100
IV	1	50	100
V	2	0	80
VI	2	50	80
VII	5	80	120
Average score	4.88	62.6	100.2
Standard deviation	3.8	38.7	25.0

were, in general, well taught. With only average ability they accomplished work considerably above the average for children of their grade.

In considering the relative efficiency of the teaching of the seven classes investigated, it should be remembered that the ability of the individual teacher is only one factor among many. What some of the other factors may be, it is the main purpose of this study to determine. Leaving the analysis of these factors for later discussion, we find in Table I the average score of each class in the three reading tests given. It is evident that, whatever the cause, a wide variation exists among them.

When the averages with their standard deviations had been calculated for the group as a whole, and the class medians for the various tests had been determined, the 171 pupils were then

grouped according to half-years of mental age, calculated to September first. The average performance of each of these mental-age groups in each type of reading test was next calculated. The results are presented in Table II. In column one is given the mental-age grouping; in column two, the number of cases in each group. Since there are only two cases in the first group they will be omitted from calculations based upon this table. For the other age groups the number of cases, while too few for any but the most tentative conclusions, may

TABLE II. THE AVERAGE SCORE OF EACH MENTAL-AGE GROUP IN EACH OF THE TESTS

Mental Age	Cases	Vocabulary		Reading Comprehension
		Sight	Phonetic	
7.5—7.9	2	100	110	13
7.0—7.4	10	126.6	95.8	9.2
6.5—6.9	27	114.3	84.0	9.1
6.0—6.4	55	103.8	60.5	4.6
5.5—5.9	53	93.6	52.2	3.1
5.0—5.4	24	75.4	34.1	1.4

serve to suggest certain facts and to point the way for further investigation.

Under *Sight* in Table II it appears that the children with a mental age of from 5.0 to 5.4 years, inclusive, can learn to recognize a fairly large number of words in this simple fashion in the course of a school year. From age group to age group there appears to be a steady increase in score, which amounts to an increase of approximately 68 percent in the number of words recognized, with a corresponding increase of two years in mental age. The greatest increase in score and in percent occurs between the 5.0–5.4 and the 5.5–5.9 age groups. The latter might well be considered the optimum mental age for beginning the teaching of reading by this method, since increasing mental age, although bringing an increase, fails to bring a proportionate increase in efficiency. This very moderate amount of agreement between mental age and the results from the sight test is expressed by the correlation $0.54 \pm .04$ (Bravais-Pearson). This

is substantiated by a comparatively low standard deviation of .25 and by the slight variation in score among the average scores of strong and weak classes.

The column entitled *Phonetic* gives the average scores of the various mental-age groups in the second part of the vocabulary test. Although its standard is approximately the same as for the sight test, the mental-age group 5.0–5.4 made an average score of 34.1 with a median score of zero. In this test, an increase of two years in mental age is paralleled by an increase of 181 percent in score. This is more than double that which we found for the sight test for the same increase in mental age, although the correlation coefficient, $.54 \pm .04$, is the same for both. Nor is the increase uniform from one mental-age group to the next. In agreement with the former test, the largest increase occurs, both in crude score and in percent, between the two lowest age groups. Between the age groups 6.0–6.4 and 6.5–6.9 occurs another large increase in score, equalled only by that between the two lowest groups. The standard deviation is larger for this test than for the sight test, and there is wider variation among the class averages.

It would seem from these data that time spent in teaching phonetic methods to children with a mental age of less than five and a half years is largely wasted, since a median score of zero is not impressive as the result of a year's faithful effort. Children with mental ages from 5.5 to 6.4 evidently do gain something from the teaching of phonetics. Yet the increase in efficiency for the next higher mental-age group, 6.5–6.9, is so great as to suggest that age as the better one at which to begin the teaching of reading by this method.

The results for comprehension, given in the last column of Table II, indicate that reading comprehension is identical with neither of the other phases of reading ability, and that it is more closely related to mental age than is either of them. This relationship is expressed by the correlation coefficient $0.69 \pm .03$. As in the other two tests, the greatest proportionate increase occurs between the first and second mental-age groups. As in

the phonetic test, achievement in comprehension exhibits the largest increase in crude scores between the mental age of 6.0–6.4 and 6.5–6.9.

Although our conclusions can be only the most tentative owing to the comparatively small number of cases for each mental-age group, it would seem that, as in phonetic work, efforts toward reading comprehension for pupils with a mental age of less than five and a half years were largely wasted. A mental age of six to six and a half was in general necessary for standard first-grade achievement. For those children who had mental ages from six and a half to seven years, the returns on the effort expended were very materially increased. This would seem to be the optimum mental age for beginning reading instruction where comprehension of printed matter is the object in view, for beyond this we seem to come to a point of diminishing returns where further increase in mental age fails to bring a proportionate increase in efficiency. All results presented must, of course, be modified by the qualifying phrase "by the methods used for the classes under investigation." How future methods may affect results we cannot, of course, foresee. This point of diminishing returns may, on further investigation, prove to be nonexistent—an illusion due to the limited number of cases. In my own classroom experience, however, I have been conscious of such a point. It may be that first-grade reading material is organized to appeal to the interests of six-year-olds. It is quite possible, however, that the key to the situation may be found in Table III.

The data of Table II seem to indicate quite definitely that achievement in each phase of reading tested increases with each half-year increase of mental age, but that success in reading comprehension is more dependent upon mental age than is success in either of the other two phases of reading ability.

As stated at the beginning of this study, in investigating the results of sorting pupils into classes upon a mental-age basis it is advisable to select as a criterion of success some measurement that is known to correlate positively and in a high degree with

general intelligence as expressed in terms of mental age. The results of the test in reading comprehension fulfill this requirement and hence furnish us with the desired criterion of success in first-grade work.

In Table III is shown the distribution of cases by half-years of mental age within each of the seven classes. The average

TABLE III. THE DISTRIBUTION OF EACH CLASS BY HALF-YEARS OF MENTAL AGE AND THE AVERAGE READING COMPREHENSION SCORE FOR EACH MENTAL-AGE GROUP IN EACH CLASS

Class		Mental Age					
		5.0–5.4	5.5–5.9	6.0–6.4	6.5–6.9	7.0–7.4	7.5–7.9
I....	Number		1	6	**17**	8	2
	Average score		6.0	8.5	**10.4**	10.2	13.0
II....	Number		1	**20**	6		
	Average score		4.0	**4.1**	8.3		
III....	Number	1	**17**	10		2	
	Average score	4.0	**4.5**	3.9		5.0	
IV....	Number	4	**10**	9	3		
	Average score	0.0	**2.0**	1.9	3.7		
V....	Number	4	**10**				
	Average score	1.3	**1.6**				
VI....	Number	**14**	7	2			
	Average score	**1.6**	2.1	2.5			
VII....	Number	1	7	**8**	1		
	Average score	3.0	4.1	**7.3**	9.0		
Average score.....		1.4	3.1	4.6	9.1	9.2	13.0

score in reading comprehension for each mental-age group of each class is also given. Even casual inspection shows that, with but few exceptions, there is within each class a definite increase in score with each increase in mental age. The exceptions occur with a regularity that invites careful study. The first exception occurs in Class I, where the mental-age group 6.5–6.9 scores 0.2 higher than the next older age group. Examining the mental-age distribution for this class, we find that it extends over five half-years. This spread is not so wide as it at first appears,

however, since half the class falls in the group 6.5–6.9, and of the three out-lying cases the one below six years has a mental age of five years ten and a half months, and an I.Q. of 105, while the two cases above seven and a half have mental ages of seven years seven months and seven years nine months, respectively. This gives the class a total range in mental age of one year ten and a half months. From this distribution it is apparent that teaching must have been directed towards the modal mental-age group, 6.5–6.9. This group scores well above the norm for children of that mental age. Turning to the mental-age group just below the modal group we find that although the average score is lower than that of the modal group, as we should expect, it is, in comparison with the achievement of other children of the same mental age, much higher. The one case lying below this latter group reveals the same fact: a lower score with decrease in mental age but increased efficiency as compared with other children of the same amount of general ability. The group next above the mode falls slightly below the score of the modal group, as we noted, instead of gaining as the additional half-year of mental age would lead us to expect. In proportion to the average achievement for that mental age, it falls still farther behind the modal group. The two cases falling above 7.4 years will have to be omitted from the discussion, as there are no other cases of the same amount of general ability with which they can be compared.

Class II shows close grouping, over half the cases falling in the modal group, 6.0 to 6.4, and the one case below the mode having a mental age of five years ten months with an I.Q. of 98. As in Class I, the teaching seems to be directed towards the modal group. The one case below the mode was kept working with approximately the same degree of efficiency. Compared to others of his own mental age, however, his efficiency is much greater than that of the modal group. Conversely, the group above the mode, though making double the score of the modal group, is a shade less efficient as compared with the average for that mental age.

Class III has seventeen cases in the modal group, one just below it, ten in the half-year above it, and two a year and a half above it. The modal group, 5.5–5.9, is again the main group taught and makes an average score of 4.5. This is 0.5 of a point above the standard first-grade score for this test. It is still better as compared with the average score of other cases of the same mental age. The one case below the mode shows a decrease in score, but, again, an increased efficiency in proportion to ability. The ten cases in the age group next above the mode form the second exception to the rule of increase of score with increase of mental age. They not only fall behind the modal group in score and far behind it in performance in relation to ability, but fail to make even the standard score for the grade. The two cases in the group 7.0–7.4 accomplish still less in proportion to their ability.

Class IV has a range in mental age from five years three months to six years nine months, or one year six months, that is, from incompetence to what we have called optimum ability, and with no clearly defined mode. The group 5.5–5.9 includes ten cases and for convenience may be called the modal group. This group makes the best score, in proportion to its ability, of any group in this class. The four cases of the group next lower make an average score of zero. The group next above the mode makes approximately the same score as the modal group, but this of course makes a much smaller relative accomplishment when compared with that of others of the same mental age. The group 6.5–6.9, three cases, makes an average score of 3.7, which is less than standard score, although we found this to be the most favorable mental age for beginning comprehension reading. From the score it would seem that teaching was directed towards the groups 5.5–5.9 and 6.0–6.4 with a little extra attention to keep the weaker brethren of these groups in step, resulting in a slightly better score for the lower age group. It would also appear that the seven outlying cases were permitted to shift for themselves. The four weaker ones got nothing, while the three strongest got the least of any in the class in proportion to the achievement of children of the same mental age in other classes.

Class V had a shifting enrollment. Foreign children were placed here until they had picked up enough English to enable them to carry work in more advanced grades. Most of the repeaters, also, were enrolled in this class. When repeaters and foreign children were excluded, only fourteen cases were left to be included in this study. Considered by themselves, the data from this remnant would not be worth much, but viewed in the light of the data from the other classes they are not without interest. Ten of the fourteen cases fall in the group 5.5–5.9. Their average score, 1.6, is poor compared with that of others of the same mental age. The other four cases fall in the next lower mental-age group, and though making a slightly lower score, manage almost to reach the average score for their mental age.

Class VI shows the modal group, 5.0–5.4, making slightly more than the average score for that mental age. The next higher group has a slightly higher score, but accomplishes less in proportion to its ability than the modal group. The group one year above the mode shows another slight increase in score and large decrease in relative efficiency.

Class VII is the small unsorted first-grade class included in the study for purposes of comparison. Besides the seventeen cases included in Table II there were enrolled two children with foreign-language handicap, four repeaters, and one child who was absent on the date of testing. Although the seventeen cases are distributed over four mental-age groups, all but two of them fall within a range of one year. Every group but one exceeds the average for its mental age. The mode, though not clearly marked, falls at 6.0–6.4, which is evidently the group towards which the teaching was directed. This group throve exceedingly. The next lower mental-age group did not do so well either in actual score or in comparison with others of the same ability, though they measured up to standard and exceeded the average for their mental age. The one case in the age group 5.0–5.4, though making a score of only 3, accomplishes most in comparison with others of his own mental age. The one case in the group 6.5–6.9 falls slightly below the average for his

mental age and accomplishes least in proportion to his ability. The relative efficiency of each mental-age group of each class is shown in Table IV, for here the average score of the group is expressed as a percent of the average score of the total number of cases of the same mental age.

TABLE IV. THE AVERAGE SCORE OF THE MENTAL-AGE GROUP IN EACH CLASS EXPRESSED AS A PERCENT OF THE AVERAGE SCORE OF THE WHOLE MENTAL-AGE GROUP

	Mental Age					
	5.0–5.4	5.5–5.9	6.0–6.4	6.5–6.9	7.0–7.4	7.5–7.9
I		193.5	184.8	114.3	110.9	100
II		129.0	89.1	91.2		
III	285.7	145.2	84.8		54.3	
IV	0	64.5	41.3	40.7		
V	92.9	51.6				
VI	114.3	67.7	54.3			
VII	214.3	132.3	158.7	98.9		

From this detailed study it would seem that for the seven classes under consideration certain tentative generalizations can be made. Whether the class is strong or weak, bright or dull, closely grouped as to mental age or distributed over a wide range, it appears that the teacher, without information as to the mental age of her pupils, adapts her teaching to the ability of the majority. The weaker members of every group appear to be the best taught. It is important to note that in the groups under investigation, no pupil was more than a year in mental age below the modal group of his class. This tendency is observed even in Class IV where the four weakest were neglected. It may be due to one or both of two causes: either there was less demanded of the modal group than it was capable of giving, in order to enable the weaker members to keep up; or the weaker pupils were receiving a disproportionate amount of the teacher's time and energy. The pupils above the average of the class in ability, on the other hand, may make a better score than the majority, but they are practically certain to accomplish less in proportion to their ability than the other members of the class.

And the higher their mental age above that of the modal group, the less is their achievement as compared with that of other children of the same mental age. This appears to hold for dull children in very dull classes and for children of average ability in dull classes as well as for bright children in average classes and for very bright children in a selected class. Superior teaching, while raising the class as a whole in the scale of efficiency, appears to have little effect upon the relative efficiency of its members. Even small enrollment, that supposed panacea for all classroom ills, fails to bring to the pupil with mental age above the average of his class the efficient teaching that the rest of the class receives.

From the above data we seem justified in assuming that the factors which condition the efficiency of the teaching of any given pupil in first-grade reading comprehension in the seven classes under investigation are not only the ability of the individual teacher, but the mental age of the pupil and his degree of mental ability as compared with that of the other pupils in the class.

A SPECIAL-CLASS CATECHISM[1]

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The problem of the special class has been presented so often and in such varied aspects that it would be presumptuous for me to attempt to offer anything new. But inasmuch as in any field it is desirable to take stock from time to time, it has occurred to me that we might profitably review some of the issues in the special education of the feeble-minded. Some of these may have been forgotten or may need restating. Others can scarcely be reviewed too often. At the risk therefore of being both dull and trite, I shall venture to state a few of the more important questions in this field. In the light of the most recent information available I shall attempt to answer them briefly, though somewhat dogmatically. The material is offered in the form of catechetical dialogue in order to emphasize the questions and answers of immediate concern to those interested in establishing, extending, or improving special curricula for unusual children. The catechism is obviously representative rather than complete.

THE SPECIAL CLASS

What is a special class?

A special class is a group of school children who have not been able to profit by the instruction of the ordinary classroom, or who are otherwise educationally or personally maladjusted in school, and who have been assembled in a small group for purposes of instruction particularly adapted to their needs as individuals and as a group.

Is there more than one type of special class?

There are many different kinds of special classes, such as orthopedic classes, sight-saving classes, restoration classes, classes for partially deaf, classes for incorrigibles or predelinquent chil-

[1] An address presented at the Special Teachers' Section of the Central Ohio Teachers Association, Columbus, November, 1924.

dren, classes for children of superior ability, classes for children with verbal handicaps, open-air or health classes, and the like.

Why then does the term special class ordinarily imply a class for mentally subnormal or feeble-minded children?

Because the special classes for the feeble-minded greatly outnumber the other types of special classes, and because these classes have received the greatest amount of scientific, educational, and social attention. Although the term special class usually implies a class of feeble-minded children, this will not always be the case, for other types of special education are rapidly being developed.

Why should feeble-minded children be placed in classes by themselves?

Because in the ordinary classroom they are a constant source of disturbance and a drag on the teacher as well as on the other pupils. They present behavior problems sometimes coupled with serious forms of misconduct which are contrary to the best interests of the normal child, who may tend to follow their example. Moreover, since they are unable to learn at the same rate or to master the same subject-matter as the normal child, they are a dead weight in group instruction. It, therefore, becomes necessary for the teacher to give them special individual attention in order to keep them up with the class as a whole. This means that the normal child does not receive the amount of the teacher's attention which is his due. This is particularly unfortunate, for whereas, the feeble-minded child ordinarily profits little from such individual attention, the normal child would profit greatly from the individual assistance which is thus denied him. Many slow normal children who might progress satisfactorily with a small amount of individual help may themselves become retarded for the lack of such help because of the physical impossibility of the teacher meeting all the demands made upon her.

But cannot these subnormal children learn to better advantage in the ordinary classroom where the incentives, methods, and

associations are of a higher type than in the special class? In other words, does not the feeble-minded child lose something by being taken out of the ordinary classroom?

This question is a natural one and perhaps more than any other has restrained many school systems from establishing special classes for the feeble-minded. Those who understand the feeble-minded reply by showing that the ideals or educational goals of the ordinary classroom are not realizable for the feeble-minded. The idea of "hitching one's wagon to a star" is a fine thought, but remember that all educational ideals must be reasonable, or within the limits of possibility. The feeble-minded cannot achieve the educational objectives of the ordinary classroom. Instead of responding to those incentives which stimulate the normal child, they acquire a vague sense of depression which, far from assisting them to realize their best capabilities, actually hinders their school progress and destroys what little ambition or initiative they may have. Moreover, the leadership of the normal child is not a spur or an incentive, but acts as a daily discouragement. The feeble-minded resemble normal children in their desire to be the center of attention, and if they cannot achieve this distinction by success, they may cultivate it through failure. Moreover, the feeble-minded child does not profit socially from association with his normal fellows but becomes the object of their unsympathetic and undiscriminating disapproval. Because of his tendency to school failure and misconduct he naturally becomes the fool of the class, a distinction which not even the feeble-minded seek.

Is not this special segregation undemocratic? Does it not deny the feeble-minded child some of his fundamental educational rights?

No. On the contrary, such segregation is ultra-democratic because it guarantees to the feeble-minded child that type and degree of education from which he can profit and which he will use in later life. It is also the most reasonable form of preparation for that degree of free social and political participation, however small, of which he is capable. Such segregation goes

far toward preventing anti-social conduct and in establishing habits of social conformity.

Is the feeble-minded child personally stigmatized by segregation in special classes?

This depends on conditions and attitudes rather than upon any inherent degradation of special-class children. The feeble-minded child is far more stigmatized and more constantly derided in the ordinary classroom, than in the special class. Indeed, the special class is frequently the means of removing the stigma of foolishness which attaches to the feeble-minded child. Binet has well said that "to be a member of a special class can never be considered a mark of distinction," but he also recognized that a subnormal child has a much greater chance of achieving desirable distinction in the special class than in the ordinary class.

The Special-Class Child

What children should be placed in a special class?

Ignoring those other types of exceptional children who need education of a different sort from that offered to the feeble-minded, it is generally agreed that the special class for the feeble-minded should as far as practical be composed of only definitely feeble-minded children.

What special children would this standard exclude who might profit more from education in the special class for the feeble-minded than from education in the ordinary classroom?

This would exclude borderline children who are too young for positive classification; borderline children who are close to the lower limit of normality; incorrigible children; children with special scholastic disabilities such as reading or arithmetic; children with language handicaps; children with sensory handicaps such as the partially deaf or the partially blind; children who are temporarily retarded; and children with persistent conduct disorders which do not amount to delinquency but which cannot be overcome in the ordinary classroom.

Should the special class exclude these children who are not positively feeble-minded but who might profit more from this type of special education than from that which they obtain in the ordinary classroom?

This is a matter of circumstances and local need. Generally speaking, the special class will do well in the beginning not to exclude those types just mentioned. Sometimes there are not enough positively feeble-minded children in a certain district or school, and admission of the other types makes the establishment of a class possible. Again, it is sometimes advisable to admit these in order that special education adapted to their particular needs may subsequently be provided as a result of the progress they make in the special class for the feeble-minded. Sometimes, also, temporary placement in a special class clarifies a diagnosis in a school system where expert diagnostic examining is not available. But let this be emphasized, such non-feeble-minded children require different instruction from that offered to the definitely feeble-minded.

What is a feeble-minded child and how may we distinguish between him and these others mentioned?

A feeble-minded child is one who because of lack of intelligence, existing from an early age, gives no promise of being able at maturity to conform to the social requirements of our day or to be able to support himself independently of outside aid or special supervision.

How can this condition be determined?

By a study which includes a review of the child's personal developmental history, since the feeble-minded generally show a genetic retardation. This study should include an analysis of the child's school record to determine what his learning capacity has been. A medical examination should be included to determine whether the condition of retardation is permanent or temporary due to physical disturbances which may be remedied. Finally and chiefly, a complete psychological study of the individual with respect to the mental factors of conduct, learning, skill, and per-

sonal traits is necessary particularly to determine the degree and quality of intelligence and also any special disabilities or special talents.

Who can make such a study?

A well-trained clinical psychologist working in cooperation with the home, the school, the family, and the physician.

Is the special-class teacher or school principal qualified to make such a diagnosis?

That depends upon the degree of experience and training which such a person may have had. If such people are trained in the use of mental tests and experienced with the different types of subnormal or maladjusted school children they can go far toward making a study of considerable reliability. The mistake should not be made, however, of relying too much on mental tests alone, or on such devices as intelligence quotients. Such studies by the teachers are much better than no studies at all, and the application of objective mental tests is vastly better than relying on one's general impressions. In actual practice such examinations by specially trained teachers seldom result in serious errors of classification, and often draw attention to children whose need might not otherwise be demonstrated.

What are some of the problems which complicate diagnosis for the examiner or render diagnosis difficult by the special teacher or other school officers?

Frequently the age of the child makes diagnosis uncertain. Sometimes the mental retardation is temporary or remediable on account of physical conditions which might be overlooked by the unskilled examiner. Sometimes the mental condition is a result of special mental disabilities or emotional disorders or is otherwise complicated in ways that cannot be readily detected by a person not employing a complete clinical diagnostic method. The problem is complicated particularly by defects which may be specific rather than general or by some special aspect of personality which may be as important as the intellectual deficiency.

What are the principal personality traits of feeble-minded children?

The ordinary feeble-minded child shows a rather simple type of personality quite similar to normal children except in degree of development. Specifically, however, the feeble-minded child shows lack of judgment, initiative, resourcefulness, ability to deal with abstract ideas, and a general slowness or dullness of reaction. The feeble-minded child is not so retarded in manual aptitude as in ideas and typically does not show serious disorders of emotion or activity except in degree.

What is the significance of this?

This implies that a child showing striking disturbances of emotion or conduct or special intellectual deficiency may not be a true case of feeble-mindedness, so that whenever a child suspected of feeble-mindedness shows important symptoms in addition to a general mental retardation one should suspect the possibility of complicating factors. Of course, a feeble-minded child may also be incorrigible, emotionally disturbed, or specifically handicapped just as a normal child may be. In a word the feeble-minded child resembles the normal child of his own mental age, except with respect to his potentiality for growth and development.

Are these feeble-minded children hard to deal with, are they personally unpleasant, or have they striking character defects?

No. On the contrary, the ordinary feeble-minded child is a pleasure to work with if one recognizes his limits. He is, under normal circumstances, happy, pleasant, affectionate, docile, willing, cooperative, and indeed has many virtues that tend to compensate for his intellectual deficiency.

But in view of this general retardation does the feeble-minded child show any aptitude for learning, or is he not educationally hopeless?

The feeble-minded child shows a definite capacity for learning, depending of course upon his general mentality. This capac-

ity is limited to concrete rather than abstract learning situations. His learning ability is relatively greater in the manual than in the verbal field and is limited to the type of learning called habit formation. His training, therefore, must be specific, definite, and concrete, rather than general or abstract.

Is he capable of profiting from the socializing influences of education?

Yes, there is much hope that under an adequate system of training the feeble-minded child may achieve a rather high degree of social adaptation and may sometimes be made socially adaptable with only a minimum of supervision, if the special-class training takes advantage of the emotional nature and develops definite social habits.

The Special-Class Teacher

What are some of the special qualifications desirable in the teacher of a special class?

In addition to those personal qualities desirable in any teacher, the special-class teacher should be particularly endowed with sympathy, understanding, patience, faith, and equanimity. She should be rather more than ordinarily stable in nervous and emotional constitution, especially vigorous physically, and in good health.

Why does she need these particular traits more than the ordinary teacher?

The demands of special-class teaching are exacting, and the work is physically more tiring. It requires a sound nervous constitution on the part of the teacher and an optimistic temperament to resist discouragement and to retain an abiding faith in her work and her pupils. She needs special social qualities because she must meet the parents both at school and at home; she must receive visitors, since the good special class is the pride of a progressive school system; and she must maintain those contacts with her professional colleagues which are necessary to a continuance and expansion of the work.

What special training does she need?

She needs more than ordinary preparation in psychology, for each child is a special problem and requires individual understanding. This means special preparation in the field of child study, genetic psychology, abnormal psychology, and mental testing. Frequently, indeed she will need this preparation in order to select or classify her children and to learn their particular strengths, and weaknesses. She needs special training in methods and teaching devices, since the training of the feeble-minded requires not merely a change in the content of instruction but also in its presentation. Still further she needs special training in manual arts, and simple industrial activities, because by far the largest amount of special-class work should be of a practical manual and industrial nature. She needs special training or skill in discipline, because the classroom management of feeble-minded children presents problems peculiar to the group.

Where can the prospective special-class teacher or one who wishes to improve her teaching get such training?

One of the best places to obtain such training is in an institution for the feeble-minded. Some colleges and universities and normal schools also offer special instruction in the psychology and pedagogy of exceptional children.

What functions has she outside the immediate field of teaching?

She has two principal duties outside her immediate teaching program. The first of these is to establish contacts with the home and with those social agencies whose help may be needed either while the child is in school or after it leaves. Her second duty outside the classroom is to promote the welfare of the feeble-minded and also other types of children needing special education. Her classroom is at once a demonstration room and a laboratory to which her colleagues may come for inspiration and information on educational matters dealing with such problems as pupil classification, special curricula, special methods, and special objectives.

Has she any other more general social responsibilities?

Yes, she has a definite responsibilty to promote the welfare of the feeble-minded outside the public school. She is an

authority in this field and should not hesitate to advise the community as to its duties and needs with respect to the feeble-minded. She is also the protagonist of her pupils. She should do what she can to obtain institutional provision for the lower grades of feeble-minded children and for those higher grades who are socially unadaptable. She should also endeavor to provide ways and means of bridging the gap between the school and the industrial or social life of her children so that her teaching efforts shall not be wasted, and that her children may retain the happiness they have enjoyed under her immediate care. In these respects she should not merely lament the situation but should carefully, constantly, and hopefully urge these needs wherever possible.

It has been said that the special class is an educational laboratory, a demonstration center, a stimulus to educational reform and progress. Just what does this mean?

It means that the establishment of the special class for the feeble-minded is one of the most important attempts to adapt public instruction to individual pupil needs. The successful special class, therefore, means much for education—for the normal child as well as for other types of exceptional children. It means also that in view of the need for special curricula, special content, and special method in the class for subnormals, the feasibility of such adaptations in a larger way is on trial. It means that here is a practical demonstration of the importance of understanding the individual abilities and disabilities of every school child. It means an examination of new theories in the field of discipline and the adjustment of teaching to the emotional needs of children. It means an experiment and a demonstration in the possibilities of correlating the school and the home, and of adjusting education to meet the ultimate social needs of each child. It means the development of new theories and principles with respect to both the means and the ends of education. It means a practical demonstration in child conservation and social welfare.

Has anything been accomplished in these ways to justify the special class from this point of view or to hearten the faithful teacher who has striven earnestly towards these ends?

A great deal has been accomplished. It may be somewhat presumptuous to say just which of the numerous educational advances of today have been stimulated from the special class, but it is certainly not too much to say that the special class has played an important part. Some of the achievements are: extension of the clinical idea from the feeble-minded to other types of special children and to the normal child himself with respect to special traits; development of clinical procedures making possible clinical study of other types of children; the rather general acceptance of the idea of classification according to general intelligence; the modification of curricula and methods in relation to degrees and types of ability. Such new devices as the socialized recitation, the project method, departmentalized instruction, manual-arts education, and others have been at least stimulated if not indeed suggested by the special class. Notice that even the mental tests used by the psychologists in the army were developed in an institution for the feeble-minded.

Principles and Practice

Assuming the establishment of a special class with the right sort of pupils and a well-prepared teacher, what subject-matter should be taught?

This will depend somewhat upon the homogeneity of the class and the grade of pupils. Assuming that the class is made up of definitely feeble-minded children with mental ages approximately between six and ten, for the most part it is generally agreed that the principal work of the special class should be manual. A portion of the work may be academic, depending upon the individual needs of the pupils.

How much academic work should be taught and how can this be determined?

In general this will depend for the most part upon the mental age of the child or children under consideration. An off-hand

way of determining this would be to subtract six years from the child's mental age, which will indicate the most probable school grade and suggest the amount of academic instruction possible in relation to the standards of the ordinary classroom. Thus a child with a mental age of eight can in general succeed at the level of the second grade of academic achievement. Or a child with a mental age of eleven should succeed at a fifth-grade level. It is well to keep in mind that in such academic subjects as reading and arithmetic, feeble-minded children seem to show a specific disability and that their learning is generally of a memorial rather than a rational type. This suggests that the amount of academic instruction should be kept certainly below a third of the total instruction and that it must be adapted as to both content and method. Generally speaking, it is inadvisable to teach subject-matter which the child has very great difficulty in learning or which he probably will not use in a practical way after leaving school. This suggests that if the academic instruction is desirable it should be made as concrete and specific as possible. In other words, the academic subjects should be taught on a strictly utilitarian basis rather than on a basis of formal discipline or cultural education.

What manual subjects should be taught?

Almost any subjects which are practically useful and which are within the range of ability of the pupils. This may be determined partly by a study of the home and community situation, partly by an observation of the child's own capabilities, and partly by the method of trial and success in the classroom. Previously the manual subjects have consisted for the most part of the primitive manual arts such as basketry, rug weaving, pottery, wood work, and the like. More recently, there is a definite tendency to teach such practical manual arts as household mechanics, housekeeping activities, rough carpentering, simple garage work, and a variety of semi-skilled industrial occupations. It is well to remember that in these regards the training must be considered specific rather than general, so that an important distinction may be made between manual arts with the feeble-

minded and manual arts with normal children, since in the latter case the manual work is an educational device promoting the growth of the individual while with the feeble-minded it becomes a practical end in itself.

In more general terms, what objectives should the special-class teacher have in mind?

She should bear in mind that the feeble-minded even under the most favorable conditions will not be able to exercise much personal initiative or to show much resourcefulness in adapting themselves to new conditions. The training must be sufficiently general to anticipate a variety of possible social situations and sufficiently detailed to provide definite industrial skill and desirable social habits. The relative amount of academic instruction may be thought of in terms of the most probable social or industrial levels to which the feeble-minded child will gravitate at maturity.

What is the underlying educational philosophy determining these objectives?

One consideration is that the feeble-minded will have great difficulty in managing their affairs with ordinary prudence or in becoming industrially self-supporting without supervision. Another consideration is that the feeble-minded are creatures of habit, and neither rationalize nor generalize their conduct. Each situation is for them specific, and they are not capable of much foresight or planning. It is also assumed that they can never take a high place in the social or political life of the community and that they are specially liable to various forms of social maladjustment, such as delinquency, sexual promiscuity, and other anti-social conduct. It is assumed that special training may go far toward overcoming these inherent limitations of the feeble-minded by providing them with habits, attitudes, and routine skills which will minimize their liability to failure.

How do these considerations condition the methods of teaching?

The teaching will need at all times to be specific, detailed, concrete, and interesting. Abstract teaching, generalization,

moralizing must be avoided. Both deductive and inductive methods are more or less fruitless. Logical development of a lesson plan becomes hopeless. While one may endeavor to proceed gradually from the known to the unknown, the teacher will find it necessary to revise her ideas of what is known or what needs to be known before the unknown may be attempted. Thus words may be taught independently of alphabetizing or spelling, writing may be taught independently of exercise work, speech may be taught independently of phonics, and manual arts may be taught independently of preliminary exercises. The importance of interest, habit formation, and happiness must never be lost sight of. Finally, the specific nature of the teaching must always be borne in mind. The child may learn to add loaves of bread without any ability to add tons of coal, or may learn to make a single bed without thereby acquiring much ability toward making a double bed.

What methods of discipline have been found most successful?

Sympathetic human understanding is the first consideration. That is, before considering discipline it is necessary to attempt to fathom the immediate causes of misconduct. As to devices, nothing is so effective with the feeble-minded as praise. "Judicious criticism" is a paradox, for the feeble-minded child makes little distinction between the extremes of complete approval and complete disapproval. Approbation, inherent interest, and sympathetic understanding of the child's ability and personality will almost wholly solve all questions of discipline.

How shall we anticipate the time when a child must leave school?

Anticipate this as soon as he enters the special class and from each day thenceforward. A serious mistake made in much special-class teaching is the failure to anticipate this eventuality early enough. All that has been said regarding objectives and methods is specifically conditioned by the situation which the child must face at the end of his school career. All arguments for or against any educational organization for the feeble-minded

must be tested against this standard. Specifically, the bridging of the gap between the special class and industry or between the school and the community should be definitely provided for by a period of continuation instruction. During this time the child might not only be supervised by the school but might also be brought back to the school for readjustment. Detroit has been definitely successful in bridging this gap by maintaining a two-year contact with each feeble-minded child leaving the special classes, during which time the relations of employer and child are smoothed out and the child is habituated to the requirements of the employment situations. At this time, the importance of certain industrial virtues such as promptness, cleanliness, carefulness, steadiness, and the like are found to outweigh the other standards of achievement which the child may have met with respect to accomplishment or skill. With such a continuation schooling, this crucial period can be made the means of socially salvaging the majority of those feeble-minded who for special reasons do not require institutional custody.

Administrative Considerations

What should be the size of the special class?

This depends on the type of pupil. If the pupils are definitely feeble-minded and all are of the same intelligence grade and there are no special problems of discipline and the teacher does not have to meet unreasonable achievement standards, then the enrollment may be as high as twenty-five. If, however, the teacher is faced with delinquents and incorrigibles and with a wide variety of degrees and types of feeble-mindedness then fifteen is a large number. In general, a safe upper limit is about twenty pupils, although a distinction may be made between enrollment and attendance. An enrollment of twenty ordinarily means an attendance of about fifteen to eighteen. In this connection, it must be remembered that these children require individual attention and require it frequently, and that the teacher is also expected constantly to study their individual needs and traits. A large class makes it impossible to meet these needs.

How many such classes should there be in the ordinary school system?

This depends, of course, upon the population. A safe way to estimate is to take at least 2 percent of the elementary-school population and divide this by 20. Thus a town of twenty-five thousand, with an elementary-school population of about five thousand, should expect to provide for at least one hundred subnormal special-class pupils, or five special classes with an enrollment of twenty per class. This is a minimum general estimate.

How should the special classes be organized?

In large systems it is generally practicable to establish one or more special classes in an elementary building. It is more desirable, if possible, to organize a special center, as this permits more flexible classification, better supervision, and more diversity of instruction. In the larger school systems there should be a special-class supervisor or a supervising special-class teacher and state supervision in the smaller districts.

What is a reasonable per-capita cost of special-class instruction and how can it be justified?

The per-capita cost will ordinarily be greater than that for the normal child but should not exceed twice the ordinary cost. This is a consequence of the small size of the class, the special nature of the classroom equipment, and the extra salary of the teacher. The cost is justified on the basis of increased school progress for both the feeble-minded child himself and the normal children in the classroom which is relieved of his presence. It is also justified in terms of the social welfare of the individual and the state, and because of the monetary saving to the state in that the child is not committed to an institution where the cost of maintenance must be added.

Should there be special supervision?

Yes, if the number of classes is large enough to justify it, because the ordinary supervisor or supervising principal will usually not be familiar with the problem, and because the work

of the special classes in a school system should be systematized, correlated, and unified.

What are the advantages of special centers over special rooms?

They make possible a much more satisfactory classification of pupils with resulting slight increase in the number per class and a decrease in per-capita cost. They also create a better *esprit de corps,* wider use of the special-class equipment, greater diversity of instruction, and greater ease of supervision.

What can be said regarding the attitude of parents and the community toward such classes?

This depends on how the situation is handled with reference to local conditions. If the work is undertaken gradually and tactfully, it has usually been found that both the parents and the community endorse and support the organization of the special class. The possible disapproval of the individual parents who may be unreasonable in the matter is more than offset by the general approval of the parents of normal children whose children are so greatly benefited, and of the neighborhood whose problems are greatly lessened as the result of the better adjustment of the feeble-minded child in the community. Moreover, the school official is expected to show a certain amount of courage in carrying out his convictions regarding the best interests of the community and the child, both of which are served by the special class.

What is the present situation through the country regarding special classes?

On the whole, the situation is most encouraging, although the extension of the special-class idea to other types of exceptional children is to some extent overshadowing the interest in feeble-minded special classes. In New York state, excellent progress is being made under the present immediate direction of Dr. Warren W. Coxe, with special attention being given to curricula and methods of instruction. The larger cities now take the special class for granted and are systematically providing for its extension and improvement. Few states, however, have standardized or unified the state-wide supervision and control of special

classes. Information in these directions is rather meager, but such as is available indicates the need for improvement, especially in the counties and smaller school districts. A study by the National Committee for Mental Hygiene[2] throws some light on the national situation. A more intensive survey made recently in the State of Ohio probably represents the status of this problem in the larger states and may be summarized.

This report of a study of special classes in Ohio, made in 1923, by The Ohio Institute,[3] shows that special classes are organized in 40 school systems or approximately 20 percent of the school districts of the state, namely, 32 cities, 6 exempted villages, and 2 county districts. The total number of such special classes is nearly three hundred, with an average enrollment of eighteen, or a total of about five thousand children, and with an average per-capita cost about one and one-half times that of the ordinary pupil. There are no uniform standards for the state as a whole regarding types of pupil, methods of selection, or character of work offered. In the absence of state supervision, each district is a law unto itself. With standards, methods, and aims depending upon the viewpoints of the supervisors or special teachers at their head, there is comparatively little coordination between school districts. Some districts admit incorrigible and retarded children, while others admit only the feeble-minded; some employ professional psychologists, while others admit on the recommendation of teachers, principals, or supervisors; some advocate a large amount of academic training, others a very small amount; some make definite provision for adjusting the child after the school period, others make no effort in this regard.

In answer, therefore, to the question, "What is the present situation?" we reply that compared with conditions as they were but a few years ago it is indeed encouraging, but that compared with conditions as they might be or as we wish them to be there is much to be accomplished.

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[2] Haines, Thomas H. "Special Training Facilities for Mentally Handicapped Children in the Public Day Schools of the United States, 1922-23." *Mental Hygiene*, 8:893-911, October, 1924.

[3] Protzman, Hannah L. *Special Classes for Mentally Deficient Children in the Public School of Ohio.* Columbus, Ohio, The Ohio Institute, 1924. 30 pp.

IS THERE VALUE IN THE FINAL EXAMINATION?

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The value of examinations, especially final examinations, is much discussed by educators, many of whom seriously doubt that this form of testing has any worth. Indeed, it has already been eliminated from a great number of public-school systems and either dropped or reduced to a mere formality in many normal-school and college courses. The current dissatisfaction is not due to any inherent faults in the examination as an element in the educational procedure, but it is provoked, rather, by weakness in construction, the unwise application of the results obtained, or the loss of time incurred by the use of long periods for cramming.

The writer has often wondered whether it is worth while to give an examination at the close of a course. In order to gain some light on this question a simple experiment with the classes in Introduction to Education at the Oregon Normal School was begun during the year 1923-24, and continued through the Fall Quarter of 1924-25. Four classes in the course were utilized, two in 1923-24 and two in 1924-25. During each term one class expected a final examination and the other did not. All students enrolled in the course were given the Otis Self-Administering Tests of Mental Ability. In order to hold the examination and the non-examination groups to approximately the same mental level a few re-arrangements of programs were made each term. All persons over twenty-four years of age and all under eighteen were eliminated from the experiment. The few men in the classes and those persons who had taken other work in education or who had read much educational literature were also disregarded. There remained, then, only women between the ages of eighteen and twenty-four, to whom the field of education was new. When all eliminations were made, the experiment was limited to one hundred students who knew there would be a final examination and one hundred who did not expect one.

The ranges of the scores on the Otis Self-Administering Test within the two groups are shown in Table I. The range for the non-examination group is from 35 to 66; in the other group, from 33 to 70. The graph, Figure 1, shows the fairly uniform distribution of mental ability for the two groups. The group expecting a final examination has a little wider spread than the non-examination group. The median for each group is 50; the mean for the examination group is 50.2, and for the non-examination group it is 50.3. Hence the two groups are practically equal in mental ability.

TABLE I. THE DISTRIBUTION OF SCORES ON THE OTIS TEST

Class Interval	Frequency	
	Examination Group	Non-Examination Group
30–34	3	0
35–39	5	8
40–44	20	15
45–49	21	23
50–54	26	21
55–59	10	24
60–64	10	8
65–69	4	1
70–74	1	0
Median	50	50
Mean	50.2	50.3

All four sections were assigned the same material for reading and study as well as the same questions and problems, and the same lectures were given. The teacher made a special effort to give the same emphasis to problems and questions in all divisions, and careful note was kept to be sure that the same problems and questions were given attention in all the groups. Naturally, exactly identical performance could not be secured in all the four classes, especially since they did not all operate simultaneously. During each quarter, however, the work of the examination and the non-examination group was nearly enough parallel for the purpose of the investigation. Also, the record kept from the first quarter made it possible to hold the work of the second term to approximately the same emphasis.

The entire course was arranged in questions, problems, readings, and lectures, which were the same for all four groups. It occasionally happened that in the second quarter a question arose which had not been presented in the first term. This occurred but seldom, however, and had little, if any, effect on the final results.

Throughout the terms in which the experiment was carried on, the examination group was told once or twice a week that the material should be mastered, since it might be called for in

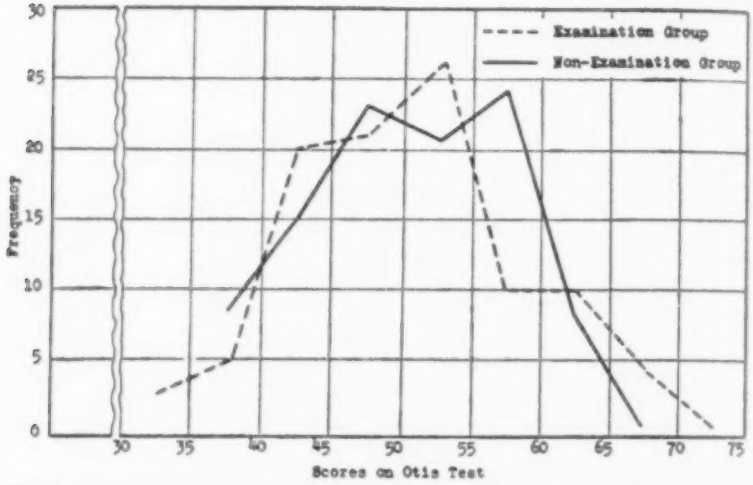

FIGURE 1. THE SCORES MADE ON THE OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY, HIGHER EXAMINATION, FORM A

the final test. On the same days, the other group was cautioned to do the work thoroughly from day to day, since there would be no provision for final review, because no final examination would be given. At least once each week, sometimes twice, and occasionally three times, each group was given a brief test on the material in hand. Sometimes the quizzes dealt with material which had been discussed in class, and sometimes with assignments which had not been taken up in class. At other times they were based on the teacher's lectures. Often the test given the two groups was the same. When it was not, it was similar and,

according to the teacher's judgment, equal in difficulty. All tests could be scored objectively. All were of the so-called "new type" tests, that is, true-false, best reasons, checking the right answer, completion, or brief identification. When merely information was tested the problems or questions were stated in such form that the answer had to be right or wrong.

Briefly, in each term of the experiment, the class procedure, both as to testing, and as to teaching and discussion, was the same in both classes. The careful record kept shows that there was but slight difference in performance. The time of the experiment for each term was twelve weeks, or thirty-six class hours.

Table II shows the ratings for the two groups on the frequent short tests. The marks of the examination group ranged from 1.1 to 4.2, while those of the non-examination group lie between the limits 1.2 and 4.0. The marking system used was a five-point scale in which 1 was the highest mark, and 5 denoted failure. In Figure 2 the marks indicated on the abscissa become smaller as they recede from the ordinate because such decrease in quantity represents an increase in value that is due to the marking system used. Especially notice that the examination group has a decidedly larger number making a mark of 2 or better than has the non-examination group.

At the close of the two periods of experiment the groups not expecting a final test were given the same one that the other sections were given. In order to obviate any disappointment or antagonism which might arise, the teacher explained the experiment and his purpose in making the study. He also gave the students their choice as to whether the score made on the final examination should be considered in making up their term marks. No displeasure because of being asked to take this test was apparent. Rather, there was evidence that students were glad to have the opportunity of taking it. They hoped that the results would prove the futility of final examinations.

Like the numerous short quizzes used, the final examination was of the "new type." In it one hundred eighty reactions were possible. All students were allowed time to finish. The scoring,

for the most part, was highly objective, and there were only a few cases in which any of several answers had to be regarded as right. Most of these called for brief identification of a person, movement, event, and the like. The teacher scored all papers himself and used the utmost care to follow a uniform procedure. Cramming was precluded by especially heavy and exacting as-

TABLE II. THE DISTRIBUTION OF MEAN MARKS MADE ON THE FREQUENT SHORT TESTS

Class Interval	Frequency	
	Examination Group	Non-Examination Group
1.0–1.4	19	4
1.5–1.9	22	4
2.0–2.4	13	23
2.5–2.9	18	33
3.0–3.4	20	25
3.5–3.9	6	9
4.0–4.4	2	2
4.5–5.0	0	0
Median (Converted)*	3.7	3.3
Mean (Unconverted)	2.3	2.8

*The term "unconverted" used with the mean score for the short tests refers merely to the mean of the scores 1, 2, 3, 4, 5 as awarded. The word "converted" in connection with the median of those scores refers to the scores when they were translated into equivalent scores in a scale in which 1 is the lowest and 5 the highest mark. Such equivalents were worked out before the coefficient of correlation was calculated.

In this converted scale of scores we have:

Mark on scale as now used in which 1 is highest	Equivalent mark in scale in which 5 is highest (converted)
5.0	1.0
4.9	1.1
4.8	1.3

signments for a period of about a week preceding the time for the final examination. The groups which expected the examination were urged not to take time for review, since they would probably profit more by keeping up the daily work well to the end of the term. Inquiry showed that little cramming was done.

The range of the scores for the final examination shown in Table III is 68 to 154 for the examination group, and 60 to 124 for the non-examination group. Note that in Figure 3 the group

expecting the final examination has a much wider spread than the other group, but this additional width of spread is entirely to the right or high side of the scale.

According to Figure 1 and the mean and median scores given in Table I the examination and non-examination groups were of

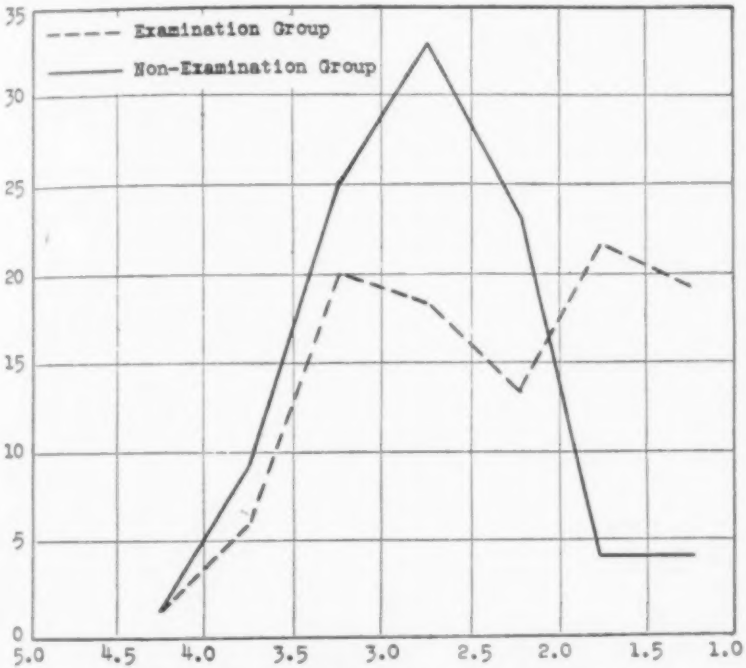

FIGURE 2. THE AVERAGES (MEANS) OF THE MARKS MADE ON THE FREQUENT SHORT TESTS

practically the same mental ability. Figure 2 and Table II show decided superiority in accomplishment for the examination group, as do also Figure 3 and Table III.

Table IV presents some interesting facts. Although it deals with two groups having practically equal mental ability as revealed by the Otis Test, it discloses different results for the two groups. It shows for the non-examination group a very low, in fact an insignificant, correlation between the Otis score and

the mean scores on the short frequent tests given in class. This low correlation seems to indicate a rather indifferent or ephemeral preparation. We find, however, a rather high correlation between mental ability and mean scores in the short tests, for the

TABLE III. THE DISTRIBUTION OF SCORES MADE ON THE FINAL EXAMINATIONS

Class Interval	Frequency	
	Examination Group	Non-Examination Group
60– 69	2	8
70– 79	6	11
80– 89	6	9
90– 99	13	21
100–109	17	33
110–119	23	16
120–129	11	2
130–139	8	0
140–149	10	0
150–159	4	0
Median	112	100
Mean	112.4	95.9

TABLE IV. THE COEFFICIENTS OF CORRELATION (PEARSON) BETWEEN THE VARIOUS SCORES

	Otis	Final Examination
Non-Examination group		
Final score	.50 ± .05	
Mean score on short tests	.20 ± .065	.66 ± .04
Examination group		
Final score	.65 ± .04	
Mean score on short tests	.72 ± .033	.79 ± .025

examination group. It appears, therefore, that in this group, better use was made of the existing mental ability. The table points out a similar comparison for the two groups in a less marked degree, in the correlation between the Otis scores and the final-examination scores. The writer's conjecture is that this condition was brought about largely by the attitude or determination with which the two groups studied. Doubtless the

examination group learned with a more definite intention of retaining the material of the course than did the other group. The effect was a clearer and more lasting impression which produced better daily work and which was conspicuous also in the final-examination results.

There is further evidence that, on the average, the students who expected an examination utilized their mental ability more

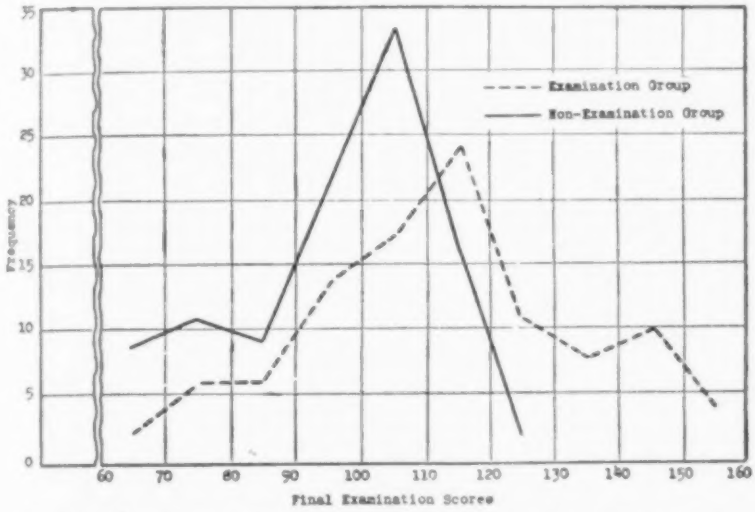

FIGURE 3. THE SCORES MADE ON THE FINAL EXAMINATION

effectively than did those who did not expect the final test. This is found in the correlation between the scores on the short tests and those made on the final examination. For the non-examination group this correlation is .66, while for the examination group it is .79. Although both coefficients are relatively high, the difference is significant.

In studying the mean scores given in Tables I, II, and III we see that the examination group surpassed the non-examination group in several particulars. A superiority of 16.6 points, or approximately 17 percent, is found in the final examination mean scores. The same group was .45 points, or about 16 percent, ahead in the mean score on the short tests. It excelled by twelve

points in the median for the final examination, and by .4 points in the median for the short tests (converted). Furthermore, a comparison of the median for the final-examination scores and the median of the means of the scores for the short tests, shows an advantage of about 12 percent for the examination group. It may be interesting to note that the average amount of time spent in study was the same for all four sections involved in the experiment. No accurate time record was kept but the students of all divisions were questioned as to the amount of time they spent in study. According to their estimates they spent an average of an hour and a half in preparation for each class meeting.

It has been stated that the examination group ranked approximately 17 percent higher in final examination marks than did the group not expecting a final test. Two other observations concerning the disclosures of that test are worthy of mention: (1) The examination group was markedly superior in profiting from the lectures given in class. The students of this group apparently grasped and retained the material presented in lecture form almost as well as they did the material which they prepared by reading. The non-examination people, on the other hand, seemed to have a comparatively vague idea of the content of the lectures. It should be stated that the groups were equally attentive while the lectures were being given. (2) The examination group not only gave a greater number of correct responses to problems, but their answers were clearly more scholarly than those of the other students. In many cases responses given by members of the latter group bordered on puerility. An example or two will suffice to illustrate this fact. One problem asked, among other things, for a brief identification or description of supervised study and silent reading. The class discussions had stressed the idea that supervised study should be thought of as directed study, guided by problems, questions, tasks, and suggestions, and that silent reading should be looked upon as directed reading. A comparison of supervised study and silent reading was made. The questions for the examination were mimeographed, and a limited amount of space was provided for the

answers, which were expected to be concise. For the two problems mentioned above, as well as for others, the non-examination group tended to give less valuable answers than those received from the other group. For example, some said that "supervised study is carried on in the classroom under the supervision of a teacher," and that "silent reading is reading to one's self, without vocalization." In the examination group there was greater tendency to bring into the discussion the idea of guidance and direction, which had been emphasized in the class discussions.

Conclusions

Definite and final conclusions naturally should not be made from this brief survey. The study indicates, however, that with the type of students involved in the experiment, the knowledge that there will be a final examination produces worth-while results.

The fact that students of the type experimented with in this study profit by knowing that they will be given a final test does not necessarily indicate that such knowledge would bring profit to elementary- and high-school pupils.

The problem seems to be worth experimenting with for different types of learners, in various subjects, and under different conditions.

THE PREDICTIVE VALUE OF COLLEGE MARKS IN MEDICAL SUBJECTS

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Since the war not a few psychologists and university officers have been employing group intelligence tests as an aid in solving certain administrative problems pertaining to the admission, grading, and promotion of college students. A certain advantage which novelty and war-time sentiment gave to this new weapon of the educationist was bound to wear off. And exactly what remains? If intelligence tests are of unique value for this purpose, their importance should be emphasized in the right quarters; if they have only small value, the extent of their usefulness, however limited, should be known; or if their practical utility with student bodies at large is entirely debatable and still awaits conclusive demonstration, the evidence necessary for a decision should be sought. What in short, is the concensus of well-informed opinion upon the value of such tests, and upon what evidence is this opinion founded?

Of tests specially devised for college use Thorndike's College Entrance Examination and Thurstone's Tests for Engineering Freshmen are possibly the most widely known. In addition, however, various other forms, modeled more or less closely upon the Army Alpha, have been used compulsorily or experimentally[1] in numerous universities. To persons familiar with the principles of test construction and with the practical results of the Alpha test as applied to the draft, it may appear reactionary or even disloyal to ask what interpretation may properly be set upon test scores obtained by students. The writer is prepared to admit that they may have great significance, but he is unable as yet to say what that significance is. The matter still appears to him

[1] The writer's experience at the University of Toronto has been with Thorndike's Examination and with the Ohio State University adaptation of Alpha as originally compiled by Professor J. W. Bridges with minor modifications in the items pertaining to general information. These tests have been used on an experimental basis in successive years with selected classes.

an open question and one that requires the fullest experimental confirmation before very broad claims can be made or before the expense of a wholesale testing program is warranted.

Test scores are usually regarded as having predictive value such as should make them a scientific aid to economy and efficiency in the hands of administrative officers. There can be no doubt of the fact that tests of this kind yield a distribution of scores more or less resembling a normal curve in form; but of what is this distribution predictive and to what extent is it predictive?

One naturally accepts as a fact that students who enter college in any given year undergo a many-sided process of development during their college career, and also that in a college generation there is considerable individual difference in this mental growth as judged by ordinary academic criteria. Furthermore, it is usually accepted that this development is preparatory for and, to some extent at least, indicative of subsequent success in everyday affairs. These commonplace observations, although presumably true, are not easy to gauge in a quantitative sense, so that we are really in the dark as to how far in general they *are* true. Of college-trained persons, for instance, it is manifestly difficult to obtain a reliable figure which would express the correlation between their relative academic success and their relative success[2] in the world of affairs. For this and other reasons the predictive value of intelligence-test scores is generally restricted, so far as quantitative treatment is concerned, to performance in college. And even here the question remains how their predictive significance may be gauged. Do correlation methods furnish an answer?

Those who assume that the test they use has intrinsic predictive force with respect to potential academic performance will incline to consider the test scores as such to be fundamental. On the contrary, others, who believe no less firmly in the intelligence-test principle, will consider that an intelligence test—

[2] The difficulty of quantitatively gauging "success" after graduation in our opinion renders an attempt to do so as undesirable as it is impracticable.

like tests for vocational or other special aptitudes—should continually be checked by verification in terms of criteria known to be reliable. The numerous tests now used in colleges render the first of these positions critically untenable in so far as the distributions therefrom do not tally, while the alternative position forces one to seek some suitable means of verifying whatever claim is made.

The most obvious objective criterion for substantiating the predictive claims of test scores has been the formal grades or marks concurrently obtained by the students who are tested. Hitherto we have shared the belief of those who considered that a reasonably high positive correlation between test scores and college marks concurrently earned by students was strong evidence in favor of the diagnostic power of a test. Our thesis in this report is that if such a view is held it is only a belief; that a high correlation of scores with academic marks or grades obtained at, or about, the time of testing cannot be accepted as conclusive evidence of the diagnostic power of a test unless it can be demonstrated that these marks or grades themselves have the predictive significance we ordinarily ascribe to them. In short, any such criterion must itself be scrutinized (for example by a further application of the correlation principle) before it can be accepted as the basis for a conclusion regarding the significance of test scores. Thus, if the college marks of a group of Freshmen are found to correlate low with the marks which those students obtain in their college course as Juniors or Seniors, and if under like conditions this is regularly found to be the case, then a high correlation of test scores by Freshmen with the academic marks they obtained during their first year or two in college may very well be contra-indicative of the diagnostic value of the test, while a low or negative correlation in these data may mean that the test has real predictive value.

From this point of view we have been constrained for the time being to leave test scores in abeyance in order first to examine the correlations which obtain in college marks throughout an entire generation of students. And the result suggests—as

far as correlation methods ever do—that the relative standing of class members in the early years of their course is not a very safe guide to their relative standing in the senior years. Not a few pertinent questions result. Is the standing in the final year the ultimate criterion of merit in college work? If not, at what point in his undergraduate career is a student's standing most truly predictive of his academic ability? It is not our object at this time, however, to interpret any of the findings but merely to record the plan of inquiry and the correlations found. Detailed interpretation of such data as well as application of the conclusions, we believe, must always depend to a certain extent upon local circumstances. Let us turn now to the conditions of the inquiry.

Comparison of academic standing offers several difficulties in principle. If the choice of subjects is largely elective there is insufficient uniformity in the subject-matter pursued by different students for the results to be strictly comparable. Moreover if the standing is given by letter grades, significant individual differences which are known to instructors may nevertheless remain completely masked in the official record of standing. These were not serious difficulties in our case, first, because our Toronto system is largely on the honor-course basis, and second because a highly standardized examination system on the percent mark basis is in vogue. Our first plan was to select a sufficient number of secondary-school pupils and trace their full academic record for four years prior to entering the university and thence forward to graduation. It was found, however, that while there was sufficient uniformity in content and in marking up to and including matriculation (college entrance), the subdivision of those pupils as Freshmen into various university courses and faculties left the results as a whole incomparable. It was also found that the numbers entering any one Arts course per year were not sufficient to warrant general conclusions. We, therefore, gave up the secondary-school phase (except for matriculation) and turned to the Faculty of Medicine which offered a sufficient number of students and also a course of study that was entirely homogeneous.

At the time of this inquiry the medical course covered five years with matriculation as the entrance requirement. The first two years were in science subjects, wholly pre-clinical, the third year was partly clinical, and the remaining years were more exclusively so. The classes of 1917-22 and 1918-23 were selected for study, having fifth-year enrollments of 130 and 209 (including 11 and 13 women) respectively.[3] The continuous record[4] from matriculation onward of those who tried the final-year examinations was dealt with. Others, who through incompetency or for other reasons did not reach the fifth year were omitted. While this meant dealing with a selected group, namely those who completed the course, it was felt that in seeking the diagnostic value of early standing only those should be included whose record was continuous as reckoned in retrospect from the final year. Not all of these Seniors had been in their class from the beginning; as is always the case a certain number with proper qualifications had joined in one or another of the earlier years. Thus only ninety-seven of the one hundred and thirty in the 1922 class had a complete record including matriculation standing. On the above basis of selection each successive year in the history of a class gave us a slightly greater number of students whose continuous record thereafter could be examined.

It is obvious that the omission of students who through incompetence failed to maintain standing in their courses leaves our data in a sense incomplete. The literature of intelligence tests with college students goes to show that test scores may have considerable value (1) in indicating cases of deficient ability before failure officially occurs, (2) in confirming the academic verdict of failure, or (3) in demonstrating indifference of students to their work. These points in themselves may

[3] The enlarged enrollment of the 1918-23 class was mainly due to the increase in numbers of men discharged from service.

[4] Acknowledgment is made of the cooperation and assistance of the Registrar of the Ontario Department of Education in furnishing us confidentially with the matriculation marks; also of the Secretary of the Faculty of Medicine and his staff in connection with the university marks here referred to. Computation of the data was by Miss D. D. Hearn, research assistant, Department of Psychology.

justify the dependence which some administrators place on tests which they believe apply in these ways. But this range of prediction by tests, as regards initial success or failure, does not essentially affect the point of our inquiry.

If it be granted that test scores are useful in predicting initial "failure" cases, the argument to some extent applies beyond the range of such cases, the thesis really being that low scores point toward small ability *and higher scores toward greater ability.* Accepting that the cases of those who fail academically through inability strongly confirm the first part of this thesis, what may be said of the complementary implied portion of the thesis? It is to this latter part of the general thesis that our inquiry pertains. Are we to assume in the case of students who maintain standing as of those who do not that the higher the positive correlation between test scores and concurrent marks the greater is the predictive value of the test in the sense of being a true measure of potential academic ability? Such an assumption would clearly impute intrinsic predictive value to early academic standing, and how far is this warranted of students who do not drop out? Our aim is not to question claims respecting test scores but rather to examine how far the promise shown by students in their early academic years is in fact fulfilled as they proceed. Or briefly, in college work how far do early individual differences remain constant?

Correlations were computed under three different arrangements of the raw data: (1) between the aggregate [5] individual standing of students in any one year and the aggregate standing of these students in each succeeding year through their course beginning with matriculation; (2) between students' standing in each subject[6] in a given year and their aggregate standing for that year and for each year following; and (3) between

[5] The aggregate standing was taken without weighting the various subjects of study.

[6] In the case of students who failed in a given subject at the end of a particular year but passed it at a supplemental examination, the average of the marks obtained at the first and second writing was taken as the standing in that subject for the year.

their standing on certain groups of subjects in a given year and their subsequent aggregate annual standings. These will be known as the *year* correlations, the *single-subject* correlations, and the *group-subject* correlations respectively. The year correlations were computed by the Pearson product moment method,[7] and the others by the rank position method.[8] The records of the class of 1923 were treated the same as those of the class of 1922; and were, as college classes go, analogous data. The class of 1923 was included in general for the purpose of affording a check inquiry.

Table I shows the year's correlations for both classes. Using as a base the aggregate standing of students year by year through their course, these several bases are correlated with each subsequent annual record. The correlations are positive in all cases.

In medical education it is generally accepted that there is a fairly sharp distinction in the kind of ability required for success in clinical subjects, from that required in pre-clinical subjects, and there may also be differences in the teaching methods employed and in the manner of assigning credits in the clinical years. These points may account to some extent for the falling off in the dimension of r as a measure of correspondence between students' standing early in the course and later.

From Table I as a whole the tendency of r to decline with advance in the course is evident. For our purpose the question is whether the predictive value of early academic standing as here indicated is not too small to warrant its use at any given stage as an objective criterion for interpreting intelligence-test scores. If one accepts the final-year standing as the best criterion of academic success, the fourth year naturally correlates well with this (.62 as an average coefficient for the two classes), the third year very satisfactorily (.56), and the first as well as the second year fairly so, the latter of these two being the better indicator.

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[7] Toops' correlation sheets were used in part of this work and were found a great convenience.

[8] The Scott Company's Tables of Coefficients for the Rank Difference Method were used wherever applicable.

TABLE I. YEAR CORRELATIONS

Base Year	Class	Correlation of base year standing with total standing in:														
		First Year			Second Year			Third Year			Fourth Year			Fifth Year		
		Cases	r	P.E.	Cases	r	P.E.	Cases	r	P.E.	Cases	r	P.E.	Cases	r	P.E.
Matriculation	1922	75	.27	.07	86	.32	.06	91	.24	.06	91	.26	.06	93	.25	.06
	1923	102	.40	.06	111	.28	.06	115	.22	.06	113	.20	.06	115	.03	.06
			.34			.30			.23			.23			.14	
First year	1922				95	.73	.03	91	.72	.08	94	.57	.04	95	.54	.04
	1923				178	.69	.03	180	.57	.03	177	.46	.04	180	.26	.05
						.71			.65			.52			.40	
Second year	1922							117	.68	.03	119	.54	.04	120	.51	.04
	1923							198	.68	.03	195	.69	.03	197	.39	.04
									.68			.62			.45	
Third year	1922										123	.75	.02	123	.68	.03
	1923										199	.66	.03	202	.43	.04
												.71			.56	
Fourth year	1922													129	.71	.03
	1923													201	.52	.03
															.62	

TABLE II. SINGLE-SUBJECT CORRELATIONS

Groups of Subjects	Class	Correlations with Total Standing in:				
		First Year	Second Year	Third Year	Fourth Year	Fifth Year
First Year						
Biology (86)[a]	1922	.91	.67	.63	.58	.47
(157)	1923	.86	.66	.54	.41	.31
Physics	1922	.85	.64	.56	.50	.44
	1923	.83	.58	.56	.45	.23
Chemistry	1922	.86	.64	.55	.55	.44
	1923	.90	.69	.62	.45	.29
Second Year						
Physiology (112)	1922		.75	.52	.31	.44
(194)	1923		.79	.58	.55	.38
Anatomy	1922		.83	.58	.54	.46
	1923		.74	.61	.60	.34
Bio-Chemistry	1922		.83	.60	.53	.44
	1923		.79	.58	.59	.24
Histology	1922		.70	.45	.39	.31
	1923		.78	.63	.58	.31
Bacteriology	1922		.49	.26	.26	.18
	1923		.57	.35	.30	.21
Third Year						
Physiology (120)	1922			.78	.60	.56
(202)	1923			.69	.52	.42
Clinical medicine	1922			.46	.26	.42
	1923			.38	.37	.43
Anatomy	1922			.63	.61	.43
	1923			.75	.57	.29
Pharmacology	1922			.71	.52	.46
	1923			.74	.50	.26
Pathology	1922			.70	.50	.39
	1923			.67	.49	.24
Clinical surgery	1922			.60	.42	.40
	1923			.40	.22	.24
Pathological chemistry	1922			.57	.48	.44
	1923			.47	.18	.12
Fourth Year						
Average on 4 lesser subjects[b]	1922				.69	.57
	1923				.64	.41
Medicine (128)	1922				.70	.54
(202)	1923				.62	.43
Pathology	1922				.73	.60
	1923				.69	.35
Surgery	1922				.62	.49
	1923				.64	.45
Pathological chemistry	1922				.73	.44
	1923				.76	.36
Gynecology and obstetrics	1922				.60	.29
	1923				.61	.33

TABLE II. (*continued*)

Groups of Subjects	Class	Correlations with Total Standing in:	
		Fourth Year	Fifth Year
Fifth Year			
Gynecology and obstetrics (130)	1922		.72
(206)	1923		.77
Medicine	1922		.71
	1923		.70
Average on four lesser subjects[c]	1922		.68
	1923		.69
Surgery	1922		.60
	1923		.73
Pathology	1922		.62
	1923		.61

[a]Figures in parentheses indicate number of cases.
[b]Hygiene, medical jurisprudence, oto-laryngology, therapeutics.
[c]Ophthalmology, pediatrics, oto-laryngology, therapeutics.

No such claim as this, however, can be made for the entrance examination (matriculation). From the raw data it was apparent that there were regularly a few brilliant students who excelled at matriculation and who continued to head the lists throughout their medical course. But from this circumstance to draw any *general* conclusion as regards the prognostic value of matriculation results in respect to success in the medical course would be, according to our data, to ignore the actual facts. The data we examined show without exception, when considered in the large, that relative success on matriculation gives no indication of success with any part of the medical course, or at best the indication it offers is scarcely to be preferred over that which might be had from pure chance.

Table II shows the single-subject correlations. The standing of students in each subject for the various years of the medical course is correlated with their total standing for each later year. The predictive value of marks in single subjects as distinct from aggregate marks may thus be reviewed. All of the major subjects in the course are listed separately, but in each of the last two years the marks on four subjects to which students devoted less time are combined. The subjects under each year in Table II

are given in rank order as correlating highly with the fifth-year standing, estimating this tendency from the average of the final-year coefficients for the two classes concerned.

From the data of Table II it may be observed:

1. As would be expected, single subjects with but few exceptions correlate highly with the year standing of which they form a part. The poorest showing in this respect is in the third year where the course was most composite and where the effects of transition from laboratory to clinical subjects were probably most marked.

2. The coefficients which single subjects in the earlier part of the course have with the aggregate standing in the later years are seen to decrease in size the farther forward this comparison is carried.

3. From Tables I and II, no single subject of an early year correlates as highly with the aggregate fifth-year standing as does the total standing of the early year in question. From this it follows that an aggregate year standing is to be preferred to standing in any single subject as an objective criterion for interpreting intelligence-test scores. As will be shown below, this rule applies not merely for single subjects but also for selected groups of subjects. The principle, therefore, is that within certain limits the more composite an academic criterion is in subject-matter the greater is its value in forecasting ultimate academic success. This principle is, of course, recognized in intelligence-test construction—the test must be composite. The problem in constructing tests for university use, however, is to ascertain what kind and amount of compositeness in the tests will yield scores which can be shown to have a higher predictive value (ultimately considered) than is possessed by academic marks in the early years.

In a medical course the relationship of laboratory and clinical studies is important from several points of view, and this question was felt to be of sufficient interest to warrant turning our present inquiry in that direction. Accordingly, the marks in certain cognate laboratory subjects and those in clinical subjects were grouped and the correlations of these sub-aggregates with the total year standings were computed as before for both classes from the second year to the fifth. The grouping of subjects and the resulting correlations are given in Table III.

The data of Table III indicate:

1. Groups of subjects such as those here selected regularly yield a correlation with the final year standing which is higher than that given

by any single subject of the year but lower than that given by the year aggregate.

2. When a group of subjects (laboratory or clinical) is pursued over more than one year of the course, the correlation thereof with final standing increases in proportion as the subject-matter is of an advanced character. Thus in the third year the laboratory work (anatomy and physiology) which is being there *concluded* correlates more highly with

TABLE III. GROUP SUBJECT CORRELATIONS

Groups of Subjects	Class	Correlated with Total Standing in:			
		Second Year	Third Year	Fourth Year	Fifth Year
Second Year					
Anatomy and physiology (commenced)	1922	.88	.59	.47	.48
	1923	.88	.67	.67	.32
Third Year					
Anatomy and physiology (concluded)	1922		.82	.69	.56
	1923		.83	.63	.42
Clinical medicine and surgery (commenced)	1922		.68	.48	.52
	1923		.61	.37	.36
Pathology and pathological chemistry (commenced)	1922		.76	.57	.49
	1923		.74	.43	.23
Fourth Year					
Clinical medicine and surgery (continued)	1922			.83	.62
	1923			.73	.52
Pathology and pathological chemistry (concluded)	1922			.92	.64
	1923			.85	.41
Fifth Year					
Clinical medicine and surgery (concluded)	1922				.73
	1923				.81

fifth-year standing than does either the group of clinical or of laboratory subjects which are being *commenced* in the third year. These latter in the fourth year correlate relatively high with the final year, but for prognostic purposes this is a late stage in the course. On the other hand, the laboratory group of subjects which were commenced in the second year correlate at that time with the final year to about the same extent as the later laboratory subjects do when these were commenced in the third year.

Summary

The interpretation of intelligence-test scores as predictive of ability to succeed in a university course is discussed and an objective criterion for that purpose is deemed necessary. The question of whether the early academic standing of students can serve as such a criterion is raised.

In order to answer this question a survey of the continuous academic record of two generations of graduating students was made and certain correlations of their marks are reported. The medical course was selected, because, in it all students studied practically identical subject-matter and their relative standings would, therefore, be comparable throughout the course. The findings for a medical course, however, cannot be accepted without proper confirmation as holding for university courses in general.

To test the predictive significance of early academic standing with reference to final standing in these classes correlations were computed as follows: (1) the aggregate standing of students each year with their standing in every successive year from matriculation onward, (2) their standing in single subjects with their aggregate standing in successive years, and (3) their standing in certain groups of subjects with their aggregate standing in different years.

In the main the findings were:

1. Matriculation results as a whole show no relationship that is significantly better than chance when correlated with aggregate standing in any year of the medical course.

2. Of marks in the medical course itself, any year standing, when correlated with later year standings, has definitely a higher coefficient of correlation the more proximate the compared years are chronologically; whereas year standings that are equally proximate to one another—but selected at different stages of the course—tend to correlate to an identical degree.

3. The standing of a class in successive years of their course (first to fourth) correlates positively with the fifth-year standing to the extent approximately of .4, .45, .55, and .6 respectively. It would, therefore, appear that early academic standing in medicine is not a very reliable criterion of ultimate standing.

4. The above coefficients of *aggregate* standing in different years with final standing are definitely higher than those possessed by *single subjects* of the corresponding years and are somewhat higher than those obtained from groups of laboratory subjects or of clinical subjects.

From these data we venture the following conclusion and suggestion. If an objective criterion for intelligence-test scores is to be had in terms of academic standing it should be determined in terms not of the early but of the later standing of students, because the indications are that the early standing is not itself reliable in a predictive sense. The procedure we would suggest is a program of verification which would require several years for completion in any university. A particular form of test should be given to several generations of Freshmen so selected that their continuous college record to graduation could in due course be compared and analyzed. In this analysis the original test scores would be one element, and ultimately their intrinsic predictive value could be directly ascertained, always with due allowance for special local circumstances. If in the outcome test scores unquestionably showed prognostic superiority over early academic ratings, then the test might confidently be used for such purposes as were deemed fit by local authorities for further generations of students. In no other way that we know of can we be quite sure what our test scores mean in university programs, at least for those students who are not weeded out at the beginning.

THE LITERATURE AND PROBLEMS OF SCHOOL BUILDINGS

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The educational importance of the school building is at last being recognized. This is clearly shown by the great amount of literature which is appearing on the subject. Out of some fifteen hundred titles which the writer has examined, three-fourths have found their way into publication since 1910. This recent emphasis is probably due to a number of causes. Chief among them is the realization that the school building is a dominant factor in shaping and controlling school policies and programs, and far more than "a device to protect children from the elements while they are being educated."

Building ceased during the war period. Since then construction costs have advanced at a remarkable rate, and the demands for education have grown stupendously so that the calls upon taxable resources have greatly increased. These reasons, coupled with new motives in education, have caused an intense interest in the building problem.

This in all its aspects is very complicated. There is no factor of the educational situation that makes demands of experts in so many different fields. The person capable of dealing adequately with all the building questions which arise would combine within himself the desirable qualities, information, and skill of half a dozen or more professions and trades. He would be an expert in public finance; in publicity; in architecture and art; in sanitary engineering; in chemistry and physics; in mechanical engineering; and in hygiene, psychology, and education. The building which gives good educational service is, therefore, the product of a cooperative endeavor in which experts from many fields make their contributions.

This complexity also helps to account for the prodigious amount of literature which is appearing on the subject. A com-

plete survey of all that has been written would take one into many fields, and its report would fill a large volume. A careful selection of materials is, therefore, necessary in order that the busy school administrator may view the chief building problems. Only a sample of the two thousand titles which would clearly come within the scope of a bibliography for school officials can be given here. Nevertheless, the sample is sufficiently large to cover almost all of the numerous phases of the subject according to present-day knowledge. The purpose is to make available here a list of the chief scientific investigations upon the subject.

Two general types of literature may be distinguished. The first and most plentiful of these is that eminently helpful and practical kind which is the product of good thinking and actual experience. Its limitations are those which always attach themselves to the product of the personal experience of one individual. The second type contains the results of scientific inquiry. It possesses a reliability and a general applicability not found in the first type, but generally speaking it has not been so immediately useful.

Other bases of classifying the literature may be adopted. For example, there are general and special works. For present purposes, the division of the bibliography into surveys, reports, codes and regulations, committee investigations, texts, and current articles has been adopted. In order to show something of the nature of each source, a few comments are made:

1. *Surveys.*—These are of two kinds, the general school survey and the special building survey. The first usually devotes one section or one chapter to the buildings. It emphasizes defects, particularly in hygiene, sanitation, and safety. While such surveys have as a rule resulted in improved housing conditions, their contributions have been small compared with their possibilities. The special surveys, as might be expected, are far more scientific and useful.

2. *Reports.*—Under this heading may be grouped the annual statements of school authorities. The older reports contain little more on buildings than their names, number of rooms, and costs. In a few cases, repairs or replacements are recommended. The more recent reports often give figures on building conditions, outline definite building programs, and in addition give the statistics characteristic of the earlier reports.

3. *Codes and regulations.*—There is a large body of codes and regulations, foreign, state, and local. The inception of the more detailed state and local codes dates from the Collinwood fire. Until the past two or three years

but little effort had been made to unify codes in conformity with accepted standards.

4. Investigations.—Reference is here made to the reports of special committees of scientists, educators, architects, and engineers, and to the studies of individuals. The bulk of the work in the administrative field has been done in the past eight years. Committee reports go back from fifty to seventy-five years and have been of vast importance in determining practice.

5. Texts.—As in the case of surveys, texts have been general and special. The first devote one or two chapters to the building, and report what is current practice at the time of publication. Special texts may be classified as those which deal with hygiene and those which deal with architecture. We have no book which treats the subject from the point of view of the school administrator, though some of the later books indicate a decided trend in that direction.

6. Current articles.—There is an abundance of current matter appearing every month. The architectural magazines feature construction and planning. Magazines concerned with state and municipal government usually take up the financial and civic aspects of the building problem. Educational magazines deal with both administrative and architectural features, with a growing tendency towards emphasis upon the educational. The Proceedings of educational organizations such as the National Education Association contain reports on current practices.

Problems awaiting solution are many. Responsibility for solving them rests mainly upon those who are working in education. The literature suggests studies which should be undertaken. Four main divisions have been made for convenience in discussion. They are, in order, as follows: School-Building Programs, Planning and Construction, Furnishings and Equipment, and Safety and Sanitation.

Each list of materials overlaps every other list. An effort has been made to point out some of this by repeating the numbers of some of the titles under the headings to which they apply. The classification is believed to be sound but by no means above criticism. The articles might to advantage be placed under different headings, depending upon the use to which the information is to be put.

I. School-Building Programs

The preparation of the building program involves six special problems: (1) planning the educational program, (2) determining the need for new buildings, (3) determining the best locations for the new buildings, (4) the utilization of the old buildings to the best advantage, (5) financing the building program, and (6) the campaign for adopting the program.

There is a large amount of literature on all these problems. Most of it, however, is of the popular type, and while it is valuable from the practical point of view, it represents isolated experience and common-sense observation rather than the results of scientific investigation. The titles will be presented in the order of the preceding list of problems.

I. PLANNING THE EDUCATIONAL PROGRAM—

What the educational program shall be is to be determined by the school authorities working as closely as they can with the community. It also implies reliance upon the application of the best theory available and upon the results of scientific study. In any case, constant change and modification are required in order to keep step with changing social conditions.

1. Anderson, Marie. "Curriculum Organization and the School Plant," *Proceedings of the National Education Association*, 1921, pp. 648-49.
2. Challman, Samuel A. "The Adaptation of the High-School Building to the School Organization," *American School Board Journal*, vol. 56, no. 1, pp. 27-28, January, 1918.
3. Cooper, Frank Irving. "Wider Use of the School Plant," *Proceedings of the National Education Association*, 1922, pp. 1484-86.
4. Hartwell, S. O. *Overcrowded Schools and the Platoon Plan.* Cleveland Survey Committee, Philadelphia, W. F. Fell Company, 1916.
5. Ittner, William B. "School Architecture That Encourages Wider Use," *Proceedings National Education Association*, 1922, pp. 1482-84.
6. Perry, A. C. *Social Center Features in New Elementary-School Architecture.* New York, Russell Sage Foundation, 1912. p. 56.
7. Putnam, J. H. "Modern Educational Movements," *Educational Review*, 55:284-93, April, 1918.
8. Spain, Charles L. "Adapting the School Plant to the Curriculum," *Proceedings of the National Education Association*, 1922, p. 1352.
See also 16, 17, 28, 59, 89, 92, 118.

II. DETERMINING THE NEED FOR NEW BUILDINGS—

Most of the articles on building programs are devoted to this subject. The writings of Engelhardt and of Hart furnish good examples of what is being done. City-school reports sometimes contain information on the subject. Current material is rapidly increasing, but little change is being made in the original technique proposed by Engelhardt. Thus there is a good deal of imitation and duplication.

9. Bullard, J. E. "Business Way of Handling School-Building Problems," *American School Board Journal*, vol. 64, no. 1, pp. 64-66, 68, January, 1922.
10. Darr, Harry W. "Initial Preparations for the Operation of a School-Building Program," *American School Board Journal*, vol. 62, no. 5, pp. 39-40, 112, May, 1921.
11. Engelhardt, N. L. *A School-Building Program for Cities.* Teachers College, Columbia University, 1918. 130 pp. (Teachers College, Columbia University, Contributions to Education, No. 96)
12. Engelhardt, Fred. "Forecasting School Population," *American School Board Journal*, vol. 70, no. 4, pp. 48-50, 129, April, 1925.
13. Engelhardt, N. L. and Strayer, George D. *Standards for Elementary-School Buildings*, 1922. 57 pp. and also *Standards for High-School Buildings*, 1924. 955 pp. New York, Bureau of Publications, Teachers College, Columbia University.
14. Engelhardt, N. L. "School-Building Programming in a Southern City," *American School Board Journal*, vol. 66, no. 2, pp. 38-41, February, 1923.
15. Fernandez, Alice B. *A School-Building Program for Gloucester, Massachusetts.* Washington, D. C., Superintendent of Documents, 1920, 16 pp. (Bureau of Education, Bulletin No. 23, 1920)
16. Fernandez, Alice B. *A School-Building Program for Athens, Georgia.* Washington, D. C., Superintendent of Documents, 1920. 70 pp. (Bureau of Education, Bulletin No. 25, 1921)
17. Hartwell, E. D. and Ittner, William B. "The Buffalo School-Building Program," *American School Board Journal*, vol. 62, no. 22, pp. 52-57, February, 1921.
18. Neale, M. G. and Severson, S. B. *A School-Building Program for the City of Winona, Minnesota.* Minneapolis, Minnesota, University of Minnesota, 1922. 66 pp.
19. Neale, M. G. and Severson, S. B. *A School-Building Program for Duluth, Minnesota.* Duluth, Minnesota, Board of Publications, 1922. 94 pp.
20. Packer, Paul C. *A School-Building Program for Cedar Rapids, Iowa.* Iowa City, Extension Division, Iowa State University, 1924. p. 98.
21. Sears, Jesse B. "Buildings and the Building Program," in *School Surveys.* New York, Houghton Mifflin Company, 1925. pp. 114-37.
22. Stevenson, P. R. "School-Building Programs," *American School Board Journal*, vol. 65, no. 3, pp. 55-56, September, 1922.
23. Strayer, George D. and Engelhardt, N. L. *A Score Card for City School Buildings.* New York, Bureau of Publications, Teachers College, Columbia University, 1920. 21 pp.
24. ——— *Program of School Buildings.* Greenwich, Connecticut, Board of Education, 1921.
See also 4, 26, 27, 28, 34, 118.

III. DETERMINING THE LOCATION OF NEW BUILDINGS—

Absolute principles for the location of new buildings cannot be given. In general, administrators have taken only a few of the related factors into consideration. Emphasis has, for example, been more upon the geographical distribution of the population than upon city growth and structure. Space and distance standards have been determined arbitrarily.

25. Dresslar, Fletcher B. "The Future Location of City School Buildings," *American School Board Journal*, vol. 44, no. 3, pp. 28-29, March, 1912.
26. Emmons, F. E. *Elizabeth Public-School Building Survey.* Elizabeth, New Jersey, Board of Education, 1920. 67 pp.

27. Engelhardt, N. L. *Survey of the School Buildings, and the School-Building Program for Atlanta, Georgia.* Atlanta, Georgia, Board of Education, 1922. 260 pp.
28. Hart, Frank W. *A School-Building Survey and Schoolhousing Program for Napa, California.* Berkeley, California, 1921. 64 pp. (Bureau of Research in Education No. 2) University of California.
29. Jones, Edward D. *The Administration of Industrial Enterprises.* New York, Macmillan Company, 1920. 442 pp.
30. Kent, Stanley A. F. *Industrial Administration.* New York, Longmans, Green and Company, 1920. 203 pp.
31. Kimball, D. S. *Principles of Industrial Organization.* New York, McGraw-Hill Book Company, 1919. 272 pp.
32. Reese, L. W. "A Score Card for Selecting a Site for a Consolidated School," *American Board Journal,* vol. 70, no. 1, pp. 79-80, 130, January, 1925.
33. Spaulding, C. S. *A Million a Year.* Minneapolis, Minnesota, Board of Education, 1916. 90 pp.
34. Strayer, George D. *The St. Paul Survey.* St. Paul, Minnesota, Board of Education, 1917. 962 pp.
See also 11, 13, 18, 20, 118.

IV. THE UTILIZATION OF THE OLD BUILDINGS TO THE BEST ADVANTAGE—

School surveys have commonly stressed the bad conditions in old buildings without making suggestions of a detailed sort for their improvement. They have seldom called attention to the need of permanent records of depreciation and for a permanent policy of maintenance. As a consequence there are very few data to guide one. We do not know how fast the various types of buildings depreciate. We do not know how to handle maintenance. We do not know when it is better to abandon an old building than to repair and remodel it. The score cards which have been used in measuring buildings, while possessing values, are rather unreliable and are not diagnostic. They do not result in estimates of the cost of additions and repairs.

35. Almack, John C. "An Introduction to School-Building Measurements," *American School Board Journal,* vol. 56, no. 6, pp. 53-54, June, 1923.
36. Almack, John C. "Building Surveys and Building Measurements," *American School Board Journal,* vol. 70, no. 1, pp. 52-53, January, 1925.
37. Burchard, F. F. "Maintenance and Upkeep of Public-School Buildings," *American School Board Journal,* vol. 63, no. 2, pp. 41-42. August, 1921.
38. Cressey, C. "School Buildings—Old and New," *American School Board Journal,* vol. 51, no. 2, p. 23, August, 1915.
39. Harwood, S. G. "Repairs to School Buildings," *American School Board Journal,* vol. 62, no. 3, pp. 35-36, March, 1921.
40. Harwood, S. G. "What Shall We Do with Our Old Buildings?" *American School Board Journal,* vol. 60, no. 4, pp. 42-43, April, 1920.
41. ————"The Remodeling and Enlargement of Schoolhouses," *American School Board Journal,* vol. 50, no. 6, pp. 25-27, 63, June, 1915.

42. Laughlin, E. V. "Renewing the Life of Aged School Buildings," *American School Board Journal*, vol. 66, no. 4, pp. 117-18, April, 1923.
43. Switzer, C. F. "Bringing the Old Plant up to Date," *American School Board Journal*, vol. 57, no. 6, pp. 33-34, December, 1918.
44. ———— "Some Successfully Remodeled Schoolhouses," *American School Board Journal*, vol. 64, no. 2, pp. 55-58, February, 1922.
See also 11, 16, 18, 26, 27, 28, 34, 115, 118.

V. FINANCING THE BUILDING PROGRAM—

The literature on building programs gives considerable space to building finance. This includes types of buildings, costs, and methods of payment. The type which a building should be is more or less an academic question, since in practice almost any building is a mixed type. Another question concerns whether buildings should be paid for at construction, or whether bonds should be issued. If bonds are issued, it is important to know what kind they should be and for what terms. There is also a question whether bonding limits should be fixed or not.

45. Alt, Harold L. "Cost of Heating and Ventilating School Buildings," *American School Board Journal*, vol. 55, no. 4, pp. 25-26, October, 1917.
46. Betelle, James O. "School-Building Construction Costs," *Architectural Forum*, vol. 37, no. 2, pp. 77-79, August, 1922.
47. Burgess, W. Randolph. "Eighty-Year Fluctuations in the Cost of American School Buildings." *Proceedings of the National Education Association*, 1920, pp. 329-30.
48. Burgess, W. Randolph, "Building Costs in 1921," *American School Board Journal*, vol. 62, no. 5, pp. 37-38, June, 1921.
49. Burgess, W. Randolph. *The Trend of School Costs.* New York, Russell Sage Foundation, 1920. 142 pp.
50. Dietrich, H. O. "Some Fallacies in Raising School Money," *American School Board Journal*, vol. 56, no. 3, p. 30, March, 1918.
51. Fowlkes, John Guy. "Justifying a Bond Issue for School Purposes," *American School Board Journal*, vol. 66, no. 4, pp. 49-51, April, 1923.
52. Fowlkes, John Guy. *School Bonds.* Milwaukee, Wisconsin, Bruce Publishing Company, 1924. 176 pp.
53. Fowlkes, John Guy. "The Retirement of School Bond Issues," *American School Board Journal*, vol. 66, no. 1, pp. 41-42, January, 1923.
54. Hutchinson, J. H. *School Costs and School Accounting.* New York, Teachers College, Columbia University, 1914. 142 pp. (Teachers College, Columbia University, Contributions to Education, No. 62)
55. Ingraham, George Hunt. "School Building Costs and the Ohio State Laws," *American School Board Journal*, vol. 62, no. 1, pp. 46-47, July, 1921.
56. Morse, Herbert M. "The Cost of School Buildings," *American School Board Journal*, vol. 67, no. 6, pp. 73-74, 76, December, 1923.
57. Sears, Jesse B. "Some Data on the Cost of School Housing," *American School Board Journal*, vol. 68, no. 6, pp. 42-44, June, 1924.
58. Smith, Tom K. "How a School District Can Obtain the Best Price for Its Bonds," *American School Board Journal*, vol. 70, no. 1, pp. 73-74, 130, January, 1925.
See also 4, 11, 16, 18, 20, 22, 27, 28, 33, 62, 63, 75, 118, 152.

VI. THE CAMPAIGN FOR ADOPTING THE PROGRAM—

Under this heading is considered the problem of publicity as it refers to building campaigns. Two features of the problem present themselves. The first is the enlistment and organization of the various social forces in the city. The second is the introduction of campaign devices. Combined with both is the program of informing and convincing the people of the need and value of new buildings. Another is sometimes given—getting out the vote on election day. The whole matter should be regarded as an education campaign.

59. Alexander, Carter. *School Statistics and School Publicity.* Boston, Silver Burdett and Company, 1919. 332 pp.
60. Alexander, Carter and Theisen, W. W. *Publicity Campaigns for Better School Support.* Yonkers-on-Hudson, New York, World Book Company, 1921. 164 pp.
61. Hines, Harlan C. and Jones, Robinson G. *Public-School Publicity.* New York, Macmillan Company, 1923. 72 pp.
62. Stetson, Paul C. "Selling a Building Campaign," *Elementary School Journal*, 20: 530-36, March, 1920.
63. ———— "Steel City Carries a Two Million Dollar Bond Issue," *School Life*, 3: 6, November 15, 1919.
See also 11, 17, 18, 20, 27, 33, 51, 201.

Editorials

THE NEW EDUCATION BILL

A bill to create a Department of Education has been drafted and will be presented to Congress on the opening day of the session. This measure differs from the bills which have been presented during the past six years in the omission of appropriations for the improvement of the school systems within the several states. It is preeminently a bill to create a Department of Education to be engaged in research.

In order to secure the coordination of the activities of the federal government in the field of education, the bill provides for the transfer of the Bureau of Education and of the Federal Board for Vocational Education to the Department of Education. It is proposed that the Board for Vocational Education operate as a division of the Department.

A unique feature of the measure is contained in the section which establishes a federal conference on education to be made up of one representative from each of the several executive departments who shall meet "to devise ways and means of improving the educational work of the federal government."

Section nine of the bill provides that:

> The sum of $1,500,000 be authorized to be appropriated annually for the purpose of paying salaries and of conducting studies and investigations, the paying of incidental and traveling expenses incurred in connection with the investigations or inquiries undertaken by the Department and for law books, books of reference, and periodicals, and the paying of rent where necessary, and for such other purposes as may be necessary to enable the Department of Education to carry out the provisions of the act.

All who are interested in research in education should support this bill. However adequately we may develop our local and

state bureaus of research it will still be of the utmost importance for us to have a national clearing house. It is only as the many separate researches conducted are assembled and interpreted that all of the workers in the field will have opportunity to profit from the experience of their colleagues. Progress in education is dependent upon the assembling of results of experiments and the dissemination of the findings with respect to the results achieved by a great national agency. Many investigations are by their very nature nationwide in their scope and can be conducted best by the Department of Education.

Opponents of the proposal to create a Department of Education with a secretary in the President's cabinet have proposed that such action would be a step in the direction of centralizing control of education. The terms of this bill would in no way change the situation with respect to the complete control of education by the several states. In so far as the publication of the results of scientific investigations may operate to modify our program of public education throughout the nation all intelligent men will consider the result most desirable. Indeed the only guarantee that we have against the continued repetition of our mistakes is to be found in the publication and distribution of the results of all scientific work carried on in the field of education.

The bill to be presented for the consideration of Congress has been developed in a series of conferences involving all interests in education. Opportunity has been afforded to qualified members of the profession to criticise the several drafts which have been necessary in the development of the measure as it now stands.

Surely all of us believe that education should be given a place comparable to that enjoyed by agriculture, commerce, and labor in the councils of the nation. Those interested in research will see in the development of this fact-finding and fact-distributing agency a recognition of the field in which they are working. All of us can agree that it is only upon the basis of such scientific investigation as may be undertaken by the Department of Education that we may hope for progress.

G. D. S.

Reviews and Abstracts

GLASS, JAMES M. *Curriculum Practices in the Junior High School and Grades V and VI.* Chicago, University of Chicago, 1924. 181 pp. (Supplementary Educational Monographs, No. 25.)

It is a common criticism that junior high schools have usually been organized for administrative purposes before those in charge had prepared for them an educational program. The result has too frequently been for the subject-matter of the intermediate grades a grouping revision, rather than a reorganization, which has usually been justified as "experimentation." Mr. Glass's report reveals in fourteen progressive cities of the United States a variation in curriculum practice for grades V-XII that is indicative of the fact that nobody knows what courses of study should be offered to the adolescent, what the content of the courses should be, or how they should be distributed to constitute a reasonable curriculum. In the wide variations of the length of day, the subjects offered—either as requirements or as electives—the time devoted to each, and the emphasis laid on the several phases of the subjects, there is some evidence, however, of a tendency toward the assuredly practical, using the term in a generous sense, and toward an opportunity for earlier specialization than had ordinarily been permitted.

Although the fourteen cities all have research departments, there is no evidence—though much may exist—that the wide variations in practice are in any scientific sense phases of experimentation. As there are no definitely stated problems, no adequate technique, no controls, no results measured in terms of aims, the results can prove nothing, either to the cities themselves or to others desiring information. Mr. Glass states that his study is a "first step." It is much to be hoped that it will be followed by others, in which for the sake of economy a large number of cities having the same problem will cooperate.

The tables of facts are numerous, clearly presented, and fairly interpreted in the accompanying comment. Anyone wishing to know the curriculum practices of the selected fourteen cities will find the report an invaluable aid; but it must not be concluded that these are the practices of all school systems in the United States. The fourteen cities were selected as being in the judgment of the author the best in the country. From time to time Mr. Glass states what "should" be done. His recommendations will meet with general approval from progressive school men; but like the practices which he presents they are the result of judgment unsupported by systematic studies, such as must be made before curricula can contribute what is expected and demanded of them.

One conclusion points to a condition that should be remedied at the earliest possible date. There is, says Mr. Glass, still a sharp division between the

eighth and the ninth grade due to the requirements of colleges for four years of direct preparation for entrance. "The ninth grade still belongs to the high school." This prevents continuity of study, which Mr. Glass thinks desirable, throughout the junior high school. The remedy is that the colleges shall accept the work of the three-year senior high school as evidence of a pupil's fitness to do advanced work.

THOMAS H. BRIGGS

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BALDWIN, BIRD T. AND STECKER, LORLE I. *The Psychology of the Pre-School Child.* New York, D. Appleton and Company, 1924. 305 pp.

This book is distinctly a preliminary and suggestive, rather than an authoritative, treatise on the psychology of the pre-school child. The discussion falls naturally into four sections: physical growth, mental development, educational activities, and social reactions. Its most important contribution is based upon the testing and measuring of 106 children, varying in age from two to six years. Although physical measurements are discussed, the interest centers about the extensive series of mental measurements reported.

It is both interesting and valuable to the psychologist to know what tests were used, and in general how children of the several age-levels responded to them. For the clinical psychologist, however, it is distinctly disappointing to find that the number of children tested at any age-level was so small that no usable norms result—the numbers tested in a few instances were twenty-five or more; in most instances, less than twenty; and in some instances, less than ten. The great need for more accurate clinical diagnosis of young children is clearly recognized by the authors. One is tempted to wish that publication of the book had been postponed until the numbers of children examined were large enough to establish norms of measurement. Since, however, the interest in experimental work with pre-school children is spreading rapidly, perhaps the assistance to others who wish to undertake such projects warrants this premature publication of experimental results.

Some of the most interesting and original mental tests are those in learning, in the early sense of rhythm and design, and in concepts of weight, number, and time.

The correlations between mental and physical tests suggest that there is a slight positive correlation between size and mental development, when the effect of chronological age is eliminated. There seems to be no correlation between carpal-bone area and mental age, when size is eliminated.

The section of the book dealing with educational activities contains helpful material about the occupations for pre-school children and the necessary school equipment. Such topics as story-telling, block-building, drawing, modelling, music, rhythm, and the initial stages of learning to read, are interestingly, though briefly, discussed.

The final section, on social development, seems meager and sketchy when one recalls the prolonged contact of the laboratory with the individual child, and the elaborate schedule for social investigation presented in the Appendix. The personality sketches of seven children are surprisingly inadequate. The

mental hygiene of early childhood which is so much in need of illumination from individual and group studies, gains little from this book.

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HOSIC, JAMES F. AND CHASE, SARA E. *Brief Guide to the Project Method.* Yonkers-on-the-Hudson, New York, World Book Company, 1924. 239 pp.

The authors collaborating in the production of this book represent a happy combination of talents. That there is a need of a definite, well-thought-out theory in any given department of education before practice is undertaken is a well-established principle of pedagogy. This point is covered by Professor Hosic in the first part of the book, for which he is directly responsible.

On the other hand, the proposition that all theory should be well tempered with practice is now commonly accepted among school men. This point is taken care of by Miss Chase, who contributes the second and third parts of the book, which deal with the topics "Sample Projects" and "Hints and Helps for Project Teachers."

In answer to the question "What is the project method?" Dr. Hosic says: "The project method, then, is a point of view, rather than a procedure. It doesn't lend itself to direct application by rule of thumb. Exhibits of it may be misleading, as they often are."

The author then goes on to discuss the question, "Why study the project method?" in answer to which he dwells upon the value of concepts in education.

After this, three chapters are devoted to a discussion of the rôle of the teacher in the project method, in which the author takes occasion to point out that the project method constitutes the real acid test of the ability of the teacher to direct tactfully the real activities of the pupils.

A chapter is devoted to a discussion of the various types of projects, another to the criteria of success in project teaching, still another to the possible application of the project idea; and a concluding chapter to the dangers and difficulties of the project method.

Part II contains ten chapters giving descriptions of typical projects as carried out in the various grades, in special classes, and by the entire school under the direction of Miss Chase in one of the schools of Hackensack, New Jersey.

Part III contains five chapters made up chiefly of quotations from different authors on the teaching of geography, history, composition, literature, and the tool subjects, with lists of typical projects and selected bibliographies.

While the discussion on the theory of the project method by Dr. Hosic is very illuminating for those who have not the time to read more thoroughly, yet one well versed in the subject cannot but feel the inadequacy of the treatment. The entire discussion appears to the writer to be but a meager résumé of a number of discussions by other authors, such as Bagley, Bonser, Kilpatrick, Strayer, Dewey, and others.

The author, however, proves himself a good disciple of Teachers College by the care with which he endorses Kilpatrick's incomplete analysis of project activities, Bagley's pet idea that history should not be taught by the project method, Dewey's pragmatism, and Strayer's inconsistent analysis of the teaching process and especially his unpsychological category of types of lessons.

All in all, however, the book has what should be a good selling title and a sufficient amount of concrete material to enable the average teacher to start on the road toward project teaching by the copy method.

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SMITH, NILA BANTON AND COURTIS, STUART A. *Picture-Story Reading Lessons, Series I.* Yonkers-on-Hudson, New York, World Book Company, 1924.

Teachers of beginning reading will welcome *Picture-Story Reading Lessons* as pre-primer reading material which is so genuinely interesting as to stimulate children to purposeful, self-directed activity. Good study habits, self-helpfulness, and reading are by-products of this purposing. The appeals are made chiefly to the child's natural interest in stories, in pictures having dramatic appeal, in such activities as cutting, pasting, making, in reading to find out, and in curiosity as to the material results forthcoming from his efforts. The satisfying results in the form of completed pictures, the enlarging story-book, and the increasing skill in both silent and oral reading lead to increased purpose as he advances through the material which holds something really new on each page. While this method is based upon principles now accepted as fundamental in efficient teaching, the completed plan is absolutely new.

Each child is provided with (1) a large "Lessons Pad" of picture backgrounds, cutouts, and directions; (2) a dictionary with picture keys; (3) a story-book pad with (4) a cover for the same and (5) a large envelope, called a Container, in which all materials are kept. These materials provide diversity of employment at the same time that they coordinate the activities and provide review. The plan of procedure makes it possible for the teacher to do group teaching and yet respect individual differences. Group teaching consists of story-telling, dramatization, and motivated drill. Individual work on the part of pupils consists of silent reading, study, learning by doing, and oral reading. These activities alternate according to need and act as a check one upon the other. The completed pictures and the increasing number of pages in the loose-leaf story-book provide a measure of the child's progress. They indicate to him and to his parent that the young pupil has something definite to do, that his work must meet absolute standards, and that it is measurable.

The lessons cover a vocabulary of 265 words. This vocabulary is composed of words having the highest frequency in the *Thorndike Word Book*, together with words having the highest frequency in ten common primers but which do not occur in the Thorndike list. According to the author's estimates

the materials occupy the time of an average beginning child six years of age mentally for approximately fourteen weeks. At the completion of this series of lessons it is assumed that the child has mastered a good vocabulary, that he has acquired those reading habits and attitudes which prepare him to read widely in the conventional primers and first readers and that he has formed proper habits of eye-movement and phrasing. In this connection it should be stated that reading experiences need not be limited to those provided in these materials. The manual gives specific suggestions for broadening the reading experiences of the day.

The *Teacher's Manual* is so explicit that the average teacher sincerely interested in the method should succeed with it. The best of teaching skill is in demand in this as in other good methods for the teaching of beginning reading. The manual is illustrated with pictures showing classes at work in groups and individually with the different materials. The pictures are so described as to make them substitutes for demonstration lessons. The manual gives special suggestions for working with slow pupils and with children who do not use the English language.

As *Picture-Story Reading Lessons* are used in schools other than those in Detroit where they have demonstrated their worth under the supervision of their author, they will evaluate themselves. We have, however, every reason to believe they will prove successful. In any case, they are contributing something definite and tangible to the problem of teaching reading to beginners.

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Publications Received for Review, July 15 to August 15

ANDERSON, CHARLES J. AND DAVIDSON, ISOBEL. *Reading Objectives; a Guide Book in the Teaching of Reading.* New York, Laurel Book Company, 1925. 408 pp.

ANDERSON, C. J. and others. *Visiting the Teacher at Work; Case Studies of Directed Teaching.* New York, D. Appleton and Company, 1925. 382 pp. (Appleton Series in Supervision and Teaching.)

BRUNER, HERBERT B. *The Junior High School at Work.* New York, Teachers College, Columbia University, 1925. 111 pp. (Teachers College, Columbia University, Contributions to Education, No. 177) Cloth, $1.50. Paper, $1.25.

CARPENTER, FRANK G. AND CARPENTER, FRANCES. *The Foods We Eat.* New York, American Book Company, 1925. 181 pp. $.72.

COFFMAN, L. D. and others. *Higher Education.* Austin, Texas, Texas Educational Survey Commission, 1925. 389 pp. (Texas Educational Survey Report, Vol. 6.)

COOK, JOHN HARRISON. *A Study of the Mill Schools of North Carolina.* New York, Teachers College, Columbia University, 1925. 55 pp. (Teachers College, Columbia University, Contributions to Education, No. 178) Cloth, $1.50. Paper, $1.25.

ENGLEHARDT, FRED. *Forecasting School Population.* New York, Teachers College, Columbia University, 1925. 66 pp. (Teachers College, Columbia University, Contributions to Education, No. 171.) Cloth, $1.50. Paper, $1.25.

FITZGERALD, N. E. and others. *Vocational Education.* Austin, Texas, Texas Educational Survey Commission, 1924. 166 pp. (Texas Educational Survey Report, Vol. 7.)

GESELL, ARNOLD. *The Retarded Child; How to Help Him.* Bloomington, Ill., Public School Publishing Company, 1925. 100 pp.

GUILLAUME, PAUL. *L'imitation chez l'enfant, étude psychologique.* Paris, Librairie Felix Alcan, 1925. 235 pp. (Bibliothèque de psychologie de l'enfant et de pédagogie.)

JUDD, C. H. *Secondary Education.* Austin, Texas, Texas Educational Survey Commission, 1924. 103 pp. (Texas Educational Survey Report, Vol. 3.)

KANDEL, I. L. ed. *Educational Yearbook of the International Institute of Teachers College, Columbia University, 1924.* New York, Macmillan Company, 1925. 650 pp. $3.00.

KILPATRICK, WILLIAM HEARD. *Foundations of Method, Informal Talks on Teaching.* New York, Macmillan Company, 1925. 383 pp. (Brief Course Series in Education.) $2.00.

KRUSE, PAUL J. and others. *Educational Achievement.* Austin, Texas, Texas Educational Survey Commission, 1925. 233 pp. (Texas Educational Survey Report, Vol. 4.)

LUCKEY, G. W. A. *The International Education Research Council and World Bureau of Education.* Washington, D. C., The Author, n. d. 19 pp.

NOONAN, MARGARET E. and others. *Courses of Study and Instruction.* Austin, Texas, Texas Educational Survey Commission, 1924. 524 pp. (Texas Educational Survey Report, Vol. 5.)

PATERSON, DONALD G. *Preparation and Use of New-Type Examinations.* Yonkers-on-Hudson, New York, World Book Company, 1925. 87 pp. $.60.

PAYNE, E. GEORGE and others. *Health and Safety in the New Curriculum; a Teacher's Training Book.* New York, American Viewpoint Society, 1925. 318 pp.

PETERSON, JOSEPH. *Early Conceptions and Tests of Intelligence.* Yonkers-on-Hudson, New York, World Book Company, 1925. 320 pp. (Measurement and Adjustment Series.) $2.16.

PITTENGER, B. F. AND WORKS, G. A. *Financial Support.* Austin, Texas, Texas Educational Survey Commission, 1925. 152 pp. (Texas Educational Survey Report, Vol. 2.)

PROSSER, CHARLES A. AND ALLEN, CHARLES R. *Vocational Education in a Democracy.* New York, Century Company, 1925. 580 pp. (Century Vocational Series.) $2.75.

ROGERS, FREDERICK RAND. *Physical Capacity Tests in the Administration of Physical Education.* New York, Teachers College, Columbia University, 1925. 93 pp. (Teachers College, Columbia University, Contributions to Education, No. 173.) Cloth, $1.50. Paper, $1.25.

SCHORLING, RALEIGH. *A Tentative List of Objectives in the Teaching of Junior High-School Mathematics with Investigations for the Determining of Their Validity.* Ann Arbor, Michigan, George Wahr, 1925. 137 pp.

SINGLETON, GORDON G. *State Responsibility for the Support of Education in Georgia.* New York, Teachers College, Columbia University, 1925. 56 pp. (Teachers College, Columbia University, Contributions to Education, No. 181.) Cloth, $1.50. Paper, $1.25.

VANUXEM, MARY. *Education of Feeble-Minded Women.* New York, Teachers College, Columbia University, 1925. 74 pp. (Teachers College, Columbia University, Contributions to Education, No. 174.) Cloth, $1.50. Paper, $1.25.

WALLON, HENRI. *L'enfant turbulent, étude sur les retards et les anomalies du développement moteur et mental.* Paris, Librairie Felix Alcan, 1925. 653 pp. (Bibliothèque de psychologie de l'enfant et de pédagogie.)

WORKS, GEORGE A. *General Report.* Austin, Texas, Texas Educational Survey Commission, 1925. 256 pp. (Texas Educational Survey Report, Vol. 8.)

WORKS, GEORGE A. and others. *Organization and Administration.* Austin, Texas, Texas Educational Survey Commission, 1925. 446 pp. (Texas Educational Survey Report, Vol. 1.)

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Doctor E. J. Ashbaugh, Ohio State University, Columbus, Ohio.

Professor J. W. Breitwieser, University of California, and Professor A. L. Boudurant, University of Mississippi, taught during the Summer Session at the University of Illinois.

Dr. F. N. Engelhardt lectured two weeks, and Dr. G. D. Strayer, one week, during the Summer School at the University of Nebraska.

Mr. Wm. J. Holloway, assistant state superintendent in Maryland, and Dr. G. A. Hilliard of the Western State Normal School, Kalamazoo, Michigan, were among the instructors at the University of Indiana this summer.

Dean F. E. Bolton, University of Washington, reports instructors from thirteen different colleges and universities on his summer-session staff. Of these Dr. David Snedden of Columbia University and Dr. H. M. Woodward of Brigham Young University are probably the best known in the field of education.

Among the visiting instructors at Harvard University during the Summer School were: V. A. C. Henmon, University of Wisconsin; H. D. Kitson, University of Indiana; W. R. Smith, University of Kansas; W. S. Eikenberry, Pennsylvania State Normal School; and Arthur J. Todd, Northwestern University.

Rural Teachers' Salaries in Michigan (Bulletin No. 5, Part I) constitutes the first part of an extended report to be made by the Committee on Teachers' Salaries of the Michigan State Teachers' Association. The summary shows the median salary to be $847 with no differentiation on the basis of the distance the teacher lives from school, or whether she must pay for board and room or boards at home. The average amount of preparation is four-tenths of a year above high school, and the median number of years of experience is 3.3. There seems to be little or no relation between preparation and salary or between salary and experience.

The eighth study in education published by the Francis W. Parker School, Chicago, is entitled *Creative Effort*. It presents the original work of children in various grades in writing, melody, dramatization, and design. The school, as stated in the Preface, presupposes that "in varying degrees and with wide individual differences and tendencies all normal children possess impulses to create." The material included gives evidence of these impulses.

Dr. Helen T. Woolley, psychologist of the Merrill-Palmer School, Detroit, has become Director of the Institute of Child Welfare Research, Teachers College, Columbia University, taking the place of Dr. Otis W. Caldwell, principal of Lincoln School, who has been acting director of the Institute. Dr. Woolley's books *Mental Traits of Sex* and *Mental and Physical Measurements of Working Children*, as well as her work in Cincinnati and Detroit, bespeak her fitness for the new position.

The National Association of Book Publishers, 25 West 33rd Street, New York City, is prepared to furnish a wide variety of materials to libraries, clubs, and schools for the celebration of Children's Book Week, November 8-14. Posters, card miniatures of posters, motion-picture slides, club programs, book projects, and circulars giving suggestions to communities in organizing a successful Book-Week celebration are among the materials listed. Circulars and some of the posters may be secured free, while other material is supplied at a nominal cost.

The Michigan State Department of Public Instruction has published a new edition of its *Preferred List of Books for School Libraries*. The books are classified by content, and the grades for which each is appropriate are indicated.

The Board of Education of Baltimore has issued a course of study in the social sciences for junior and senior high schools. It is a volume of nearly six hundred pages with extensive outlines, bibliographies, and exercises to assist the teacher in the presentation of the subject.

E. P. Cubberley of the Stanford University School of Education reports an increase of 60 percent in the enrollment this summer as compared with last. The graduate students comprised slightly more than 80 percent of the enrollment. Approximately one-sixth of the number have already taken their Master's degrees.

W. H. Burdick, director of the Bureau of Research, Schenectady, New York, has furnished us with a mimeographed copy of his *Report of the Results of the Standard Achievement Tests* in the schools of that city. The comparison of city medians with standard shows the various grades at or near standard in all items of the test.

Two of the University of Missouri bulletins (Education Series, Nos. 15 and 16) are reports of school-building programs, one for Columbia and the other for Joplin. Both are written by M. G. Neale, dean of the School of Education, University of Missouri. In both cases the present situation, the educational program, and the financial situation are given consideration.

The superintendent of schools at Lincoln, Nebraska, in Report Number 5, raises the question, "Are the schools producing desired results?" The report shows graphically that regularity in attendance is increasing, tardiness is decreasing, truancy is disappearing, and fewer pupils are failing. It shows also that achievement in such subjects as reading, arithmetic, and spelling compares favorably with norms developed elsewhere.

Professor Harl R. Douglass, University of Oregon, Dr. J. Harold Williams, Southern Branch of the University of California, and Dr. C. R. Stone, formerly of St. Louis and author of the book, *Silent and Oral Reading*, were among the most widely known men from off campus teaching at Stanford University this summer.

Ernest C. Witham, director of the Research Department of Wilmington, Delaware, announces the creation of a research council composed of twelve teachers from the various schools, two elementary principals, the superintendent, the assistant superintendent, and the high-school principal. This group is to meet each month with the Director of Research to discuss research work and to bring helpful suggestions from the teachers.

The *Ninety-Fifth Annual Report of the Board of School Commissioners of Baltimore, Maryland*, shows the per-capita cost of educating pupils in Baltimore for the school year 1923-24 was as follows: elementary and kindergarten, $75.87; junior high school, $109.78; senior high school, $135.16; vocational, $342.69; teacher training, $143.22. The per-capita cost for all day schools was $85.55; for all summer schools, $4.66; for all night schools, $10.15.

Occupational Efficiency of the Mentally Defective (Bulletin of the University of Minnesota, Educational Monograph No. 7) is a report of the survey of the inmates of the School for Feeble-Minded and Colony for Epileptics at Fairbault. The conclusion is reached that intelligence tests carefully and skillfully applied may constitute an index of the efficiency in industry to be expected from adults testing under thirteen years mentally.

Dean John H. Minnich, University of Pennsylvania, reports that J. G. Masters, principal of Central High School, Omaha, Nebraska; Fred S. Shepherd, superintendent of schools, Passaic, New Jersey; and Ralph W. Pringle, principal of the University High School, Illinois State Normal University, were the out-of-state members on his summer-session staff.

A recent mimeographed bulletin of the Cuyahoga (Ohio) County public schools contains a report of standard-test results in reading, arithmetic, language, and spelling. Supplementary sheets also report test results in English composition, Latin, and algebra. Mr. Baer, assistant county superintendent, who is in charge of this work, has developed a variation in graphing test results which he believes more closely approximates the truth of the situation. His method is to divide the space between the vertical grade lines into ten parts representing the school months, and plot the score for the month in which a test is given on the corresponding month division of the grade. In this manner the norm line is progressive, and a class median for a test given at any time during the year is compared with the corresponding point on the line which represents a progressive norm.

The Teaching Personnel in Village and Rural Schools (University of the State of New York, Bulletin No. 823), by George M. Wiley, assistant commissioner of education of New York, shows the present status of the academic and professional training, the experience, the tenure, and the salary of the teachers in the schools of the state. Among the significant findings are: about 12 percent of the rural teachers are normal-school graduates as against 3 percent in the United States as a whole; 9 percent are without any professional preparation while the proportion for the country, as a whole, is more than 30 percent; and 73 percent are high-school graduates in contrast to the nation-wide figure, 50 percent. The average age of the one-room rural teacher is 23, the average salary is twenty-four dollars a week, and the average experience is between three and four years.

Dean W. W. Kemp, School of Education, University of California, included among his summer-session faculty the following men from other institutions: John Adams, University of London; F. E. Bolton, dean, College of Education, University of Washington; J. C. DeVoss, San Jose' Teachers College; Frank P. Graves, New York State Commissioner of Education; John L. Horn, Mills College; Leonard V. Koos, University of Minnesota; Walter S. Monroe, University of Illinois; and C. C. Peters, Ohio Wesleyan University.

Dr. F. L. Stetson, director of the Summer Session, University of Oregon, lists the following visiting professors during the summer at the University School of Education at Portland: Superintendent E. D. Price, Enid, Oklahoma; Miss Marion Brown, dean of girls, University High School, Oakland, California; Professor W. F. Kennedy, director of the platoon schools in Pittsburgh; and Miss Elsie A. Pond of Teachers College, Santa Barbara.

The State Department of Public Instruction of Montana has published a course of study in English. The course sets up aims of the English course and designates materials in the various phases. An extensive study of errors made by high-school pupils in twenty-nine different schools of the state is reported. A study of the pupil popularity of English classics is also reported. *The Vision*

of Sir Launfal stood first with ninth-grade children; *Silas Marner*, with tenth; *A Tale of Two Cities*, with both eleventh and twelfth.

The California Society for the Study of Secondary Education was incorporated last spring as the legal successor of the California High-School Teachers' Association. The charter defines its purposes to be:

1. To conduct research in education, with special reference to public secondary education.
2. To disseminate information concerning the facts of the present system of education, and more particularly with reference to public secondary education.
3. To report on the best practices, plans, and policies tending to improve public secondary education.
4. To do any and all things necessary to accomplish these purposes.

We will look to this society for productive work in the field and hope that similar ones may be sponsored elsewhere.

A number of attempts are being made to organize the materials of instruction in the different subjects so that they will in a measure teach themselves. The Diagnostic Practice Sentences in Handwriting published by the Public School Publishing Company, Bloomington, Illinois, and devised by E. W. Leamer, director of the Normal School at Mayville, North Dakota, represent such an attempt in the field of handwriting. They consist of a series of sentences of the same length but of increasing difficulty and complexity. With each sentence is a simple exercise consisting of a few letters or combinations of letters. These exercises are selected from the sentence and represent typical difficulties. The sentences are reproductions of children's writing and they are placed on cards, two on each side of the card. The procedure advised in the directions that go with the cards is that each child should practice a given sentence until he comes up to the standard of his grade in that sentence. He should then, in similar fashion, practice the next one, and so on. The simplicity of the system is particularly attractive. The readiness with which a child can measure his progress is another good characteristic. Whether there is enough variety to provide satisfactory work throughout a succession of grades is a question which will have to be answered by experience.

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The Classification of Educational Material

The advance during the past short generation in the serious and systematic study of education has resulted in an astonishing increase in professional publication in the field. There are in the United States upwards of two hundred magazines devoted wholly to education, and the number of books, bulletins, and reports, already large, is rapidly increasing each year. When the publications were few a student could reasonably be expected to read everything of importance, certainly everything bearing on his special interests, and he could trust his memory or his amateur notes for what he later needed. But

today all this is impossible. One cannot hope even to know of all important publications in education, to say nothing of reading them, and when one attempts to find what bears on some special topic one has few sources of assistance.

When the Dewey Classification System, the one most generally used by librarians in this country, was issued, education was given the single number 370. Under it must be accessioned and shelved all the material on education: history, philosophy, psychology, methods, measurement, rural schools, colleges, buildings, budgets, Americanization, the numerous subjects of study, and all the other overlapping fields. The provision for educational materials was inadequate in 1910; it is absurdly so in 1925.

Great special or departmental libraries of educational materials, such as those in our leading universities, have attempted in various ways to meet the demands for classification. But there is little or no uniformity in practice, and both librarians and students recognize the inadequacy of any scheme that has been used or proposed. There is need and demand for a uniform classification of educational materials that may be used alike by special and by general libraries. It should be undertaken cooperatively by a commission of professional educators and professional librarians, preferably appointed by the National Education Association and by the American Library Association.

Workers in fields other than education have many valuable aids when they attempt to secure material on any special topic. Not only are pertinent books usually grouped on the shelves, but the card catalogue, the several cumulative magazine indexes, finding lists, and bibliographies offer assistance. For educational topics, however, bibliographies are inadequate; when existent they are seldom comprehensive, sufficiently annotated, or up to date. The cumulative magazine indexes consider only a few educational publications and seldom make reference to parts of articles. And, for reasons to be set forth presently, card catalogues are of small value.

There are two chief reasons, besides that of expense, why card catalogues are not made adequate for material help to workers in the field of education: first, the complexity of most educational articles; and second, the lack of uniformity in nomenclature. "Retardation of Pupils in New Hampshire High Schools as Revealed by the Kennedy Tests in Latin" is a not untypical title for an educational article. For such an article at least five, and probably eight or nine, index cards should be made. If such books as Strayer and Norsworthy's *How to Teach* are to be maximally useful, they must be indexed under all important topics treated, namely, Memory, Standard Tests, Completion Tests, Trabue Completion Tests, and so on. This requires the reading of each publication by someone trained not only in library technique but also in education. It would also be facilitated by a classification index containing a necessarily large number of *See* and *See also* entries.

Appreciating this fact the National Education Association Committee on the Coordination of Research Agencies appointed in 1921 a subcommittee,[1] which since the passing of the parent committee has continued independently, with a recently increased membership, to devise such an index. Under the im-

[1] The Subcommittee consists of Thomas H. Briggs, *chairman*, B. R. Buckingham, and S. A. Courtis.

mediate direction of Professor Buckingham, of Ohio State University, where the most extensive and effective work has been done in cataloguing educational materials, the index is nearing completion. A tentative list of topics was mimeographed, bound up in a volume of 167 pages, and distributed to two hundred and fifty representative school people and librarians for criticism. On the basis of the criticisms and suggestions contained in numerous returns, the index is being revised and put into more usable form. It is hoped that it will be published by the National Education Association.

The lack of uniformity in educational nomenclature limits the effectiveness of such indexes as are made. Workers use synonymously such terms as child, pupil, student; mark, grade, standing; aim, objective, purpose; curriculum, course of study, program of studies; program, schedule, time table. Even if an individual is consistent in his use of terms, he is likely to be confused when attempting to use an index made by someone else. Some years ago a committee, of which the late Charles Hughes Johnston was chairman, made a tentative report[2] on uniform nomenclature; but its influence has been small. More recently the National Education Association has appointed another committee,[3] but it has taken the position that the task is so involved with varying and unsettled fundamental conceptions that it will attempt to define only such terms as are referred to it. Although there are some dangers in defining terms at present, it is impossible for the much needed indexing to be done most effectively and economically until at least tentative definitions are proposed.

This brief article is intended to bring before those interested, especially the members of Educational Research Association, the conditions that handicap students in the field of education, to report progress, and to make two recommendations. One has already been stated: that the National Education Association be urged to cooperate with the American Library Association in the preparation of a scheme of shelf classification of educational materials.

The other recommendation is that some agency, preferably the National Education Association or the United States Bureau of Education, be urged to prepare and issue monthly printed index cards for all publications—books, periodicals, reports, and pamphlets—that bear on education. As is well known, the Library of Congress now issues for sale printed index cards for everything that is copyrighted; but these are for two reasons inadequate for the needs of educational workers. In the first place, they are not made by index experts trained in education; and, in the second, merely reproducing tables of contents, they are not analytic.

Index cards properly made for educational publications would do much to facilitate the work of students in the field by making known where any topic is treated. They would save a tremendous amount of duplication. Under existing conditions every student of a topic must make his own bibliography, which because of the number of publications, as noted before, is sure to be incomplete. It is believed that such cards could be sold to a sufficient number of subscribers to pay for the cost of preparation.

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[2] See Johnston, Charles H., Newlon, Jesse H., and Pickell, Frank G. *Junior and Senior High-School Administration.* New York, Charles Scribner's Sons, 1922. 399 pp.
[3] John W. Withers, *chairman.*